3Com ®

CoreBuilder™ 7000 Family ATM Switches Installation & Startup Guide

Software Version 4.0 (Base)

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3COM CORPORATION LIMITED WARRANTY

ABOUT THIS GUIDE

The *CoreBuilder™ 7000 Family ATM Switches Installation and Startup Guide* provides all the information you need for installing and powering up the CoreBuilder 7000 family ATM switch in ATM networking environments.

This guide is intended for the system administrator, network equipment technician, or network manager who is responsible for installing and managing network hardware such as the CoreBuilder 7000 family ATM switch. It assumes a working knowledge of network operations and familiarity with communications protocols that are used in networks. No prior knowledge of 3Com's CoreBuilder 7000 networking equipment is necessary to understand this manual.

> *If the information in the release notes that are shipped with this product differs from the information in this guide, follow the instructions in the release notes.*

Finding Specific Information in This Guide

This table shows the location of specific information in this guide:

Table 1   Information in this Guide

If you are looking for	Turn to
An overview of the CoreBuilder 7000 family ATM switch and components	Chapter 1
Instructions for unpacking the CoreBuilder 7000 family ATM switch	Chapter 2
Information about installing your CoreBuilder 7000 family ATM switch	Chapter 3
How to install and hot swap modules and cards and connect cables	Chapter 4
The system power-up procedure and initial system checks	Chapter 5
How to configure the CoreBuilder 7000 family ATM switch	Chapter 6

Table 1 Information in this Guide (continued)

How to use the Fast Setup procedure	Chapter 6
Installing a redundant power supply	Chapter 7
Installing a redundant switching module	Chapter 7
How to troubleshoot your system	Chapter 8
Hardware and protocol specifications	Appendix A
Safety information	Appendix B
Site Requirements	Appendix C
Getting technical support	Appendix D

Conventions

Table 2 and Table 3 list conventions that are used throughout this guide.

Table 2 Notice Icons

Icon	Notice Type	Description
	Information note	Information that describes important features or instructions
	Caution	Information that alerts you to potential loss of data or potential damage to an application, system, or device
	Warning	Information that alerts you to potential personal injury

Table 3 Text Conventions

Convention	Description
Screen displays	This typeface represents information as it appears on the screen.
Syntax	The word "syntax" means that you must evaluate the syntax provided and then supply the appropriate values for the placeholders that appear in angle brackets. Example:
	To enable RIPIP, use the following syntax:
	`SETDefault !<port> -RIPIP CONTrol = Listen`
	In this example, you must supply a port number for <port>.
Commands	The word "command" means that you must enter the command exactly as shown and then press Return or Enter. Commands appear in bold. Example:
	To remove the IP address, enter the following command:
	SETDefault !0 -IP NETaddr = 0.0.0.0

Table 3   Text Conventions (continued)

Convention	Description
The words "enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press Return or Enter. Do not press Return or Enter when an instruction simply says "type."
Keyboard key names	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press Ctrl+Alt+Del
Words in *italics*	Italics are used to: ■ Emphasize a point. ■ Denote a new term at the place where it is defined in the text. ■ Identify menu names, menu commands, and software button names. Examples: From the *Help* menu, select *Contents*. Click *OK*.

Documentation

This section provides information about supporting documentation, including:

■ CoreBuilder 7000 Family ATM Switch Documents

■ Related Documents

CoreBuilder 7000 Family ATM Switch Documents

The CD-ROM (No. 3C37091) that comes with your system contains on-line versions of the documents:

■ *CoreBuilder 7000 Family ATM Switches Installation and Startup Guide*

This guide describes how to install and setup a CoreBuilder 7000 family ATM switch.

■ *CoreBuilder 7000 Family ATM Switches User Guide*

This guide explains how to configure and network CoreBuilder 7000 family ATM switch, as well as a detailed explanation of its theory of operation.

■ *Release Notes*

The release notes contain information about the latest software release.

The complete documentation for the CoreBuilder 7000 family is shown in Table 4.

Table 4   CoreBuilder 7000 Documentation

Document	3Com Part Number
CoreBuilder 7000 Family ATM Switches User Guide	DUA3700-0AAA03
CoreBuilder 7000 Family ATM Switches Installation and Startup Guide	DUA3700-0BAA03
CoreBuilder 7000HD Switch Release Notes	

Related Documents   Documentation related to the CoreBuilder 7000 family ATM switch is presented in Table 5.

Table 5   Related Documentation

Document	3Com Part Number
CoreBuilder 7200 Ethernet/ATM Interface Card Installation and Administration Guide	DUA7200-0BAA01
CoreBuilder 7200 Ethernet/ATM Interface Card Operation Guide	DUA7200-0AAA01
CoreBuilder 7400 Ethernet/ATM Interface Card User Guide	DUA7400-0AAA01
CoreBuilder 7600 Fast Ethernet Interface Card User Guide	DUA7600-0AAA01
8-Port Board ATM Interface Card User Guide	DUA3708-0AAA01
622 Mbps ATM Interface Module User Guide	DUA3762-1AAA01
DS-3 Interface Module Installation Guide	DIA00DS-1AAA01
FastBUS Board User Guide	DUA37FB-1AAA01
SuperStack II Switch 2700 Operation Guide	DUA2700-0AAA02
SuperStack II Switch 2700 Installation & Setup Guide	DUA2700-0BAA02
SuperStack II Switch 2700 Adminstration Guide	DUA2700-OCAA02
ATMvLAN Manager User Guide (UNIX 4.22)	09-1046-002
ATMvLAN Manager User Guide ('97 Windows NT)	09-1112-001

Documentation Road Map   The following table helps you locate the information you need.

If you want to...	Read...
Learn about new features or corrections in the CoreBuilder 7000 family ATM switch software.	the *Release Notes*
Learn about changes to the CoreBuilder 7000 family ATM switch's documentation.	the *Release Notes*
Get an overview of the CoreBuilder 7000 family ATM switch system components.	*Installation and Startup Guide*
Prepare your site for CoreBuilder 7000 family installation.	*Installation and Startup Guide*
Learn about various configurations in which you can install your CoreBuilder 7000 family ATM switch.	*Installation and Startup Guide*
Install and power up your CoreBuilder 7000 family ATM switch.	*Installation and Startup Guide,*
Learn about how you administer and manage the CoreBuilder 7000 family ATM switch.	*User Guide*
Learn about ATM and how it is implemented in the CoreBuilder 7000 family ATM switch.	*User Guide*
Learn about LAN Emulation and how it is implemented in the CoreBuilder 7000 family ATM switch.	*User Guide*
Find out what type of configuration tasks you can perform on the CoreBuilder 7000 family ATM switch.	*User Guide*
Quickly set up your CoreBuilder 7000 family ATM switch for management access.	*Installation and Startup Guide*
Perform configuration or administration tasks using the Administration Console.	*User Guide*
Get assistance.	Technical Support Appendix in any guide

Documentation Comments

Your suggestions are very important to us. They help us make our documentation more useful to you.

Please send e-mail comments about this guide to:

sdtechpubs_comments@3Com.com

Please include the following information when commenting:

■ Document Title

- Document Part Number (found on back page of each document and in Table 4)

- Page Number (if appropriate)

Year 2000 Compliance

For information on Year 2000 compliance and 3Com products, visit the 3Com Year 2000 Web page:

http://www.3com.com/products/yr2000.html

1
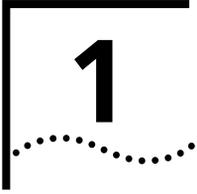
OVERVIEW

This chapter contains an overview of the CoreBuilder™ 7000 family ATM switches including:

■ CoreBuilder 7000 Family

■ Component Summary

■ Installing the CoreBuilder 7000 Family ATM Switch

■ Starting up the CoreBuilder 7000 Family ATM Switch

■ Redundancy in the CoreBuilder 7000 Family ATM Switch

■ Troubleshooting

For an overview of the operation of the switch, see Chapter 1 of the *CoreBuilder 7000 Family ATM Switches User Guide*.

CoreBuilder 7000 Family

The CoreBuilder 7000 family ATM switches are modular, high-performance ATM switches designed to increase the capacity and manageability of enterprise networks. This allows you to scale performance to extremely high levels as your network grows and evolves. The CoreBuilder 7000 family ATM switches includes the CoreBuilder 7000 ATM switch and the CoreBuilder 7000HD High Density ATM switch.

CoreBuilder 7000 Switch

The CoreBuilder 7000 switch has all the features and flexibility necessary to handle a range of needs on both the ATM backbone and the ATM network boundary. It provides a backbone solution for small and medium size networks. It is a modular platform that provides a switching fabric for ATM, Ethernet/ATM and Fast Ethernet interface cards. The 2.5 Gbps CoreBuilder 7000 switching engine supports switched LAN interfaces in the wiring closets of large networks, and is well suited for the backbone of small to medium-sized networks.

CoreBuilder 7000HD Switch

The CoreBuilder 7000HD switch supports demanding enterprise backbones and high-density data center applications, providing high-performance ATM switching at both the network core and boundary. The CoreBuilder 7000HD platform features a 5.0 Gbps switching engine that provides capacity for up to 32 non-blocking OC-3 155 ports or up to 8 non-blocking OC-12 622 Mbps ports. Using an enhanced i960CF processor, the CoreBuilder 7000HD switch supports faster signaling, expanded memory, and higher performance LAN Emulation services. The switch also accommodates scalable, high density Ethernet/ATM, Fast Ethernet and Gigabit Ethernet interface cards. The four-slot chassis allows for a mixture of port types with versatile media options for a wide range of network configurations.

Component Summary	Figure 1-1 shows the components of the CoreBuilder 7000 family ATM switch.
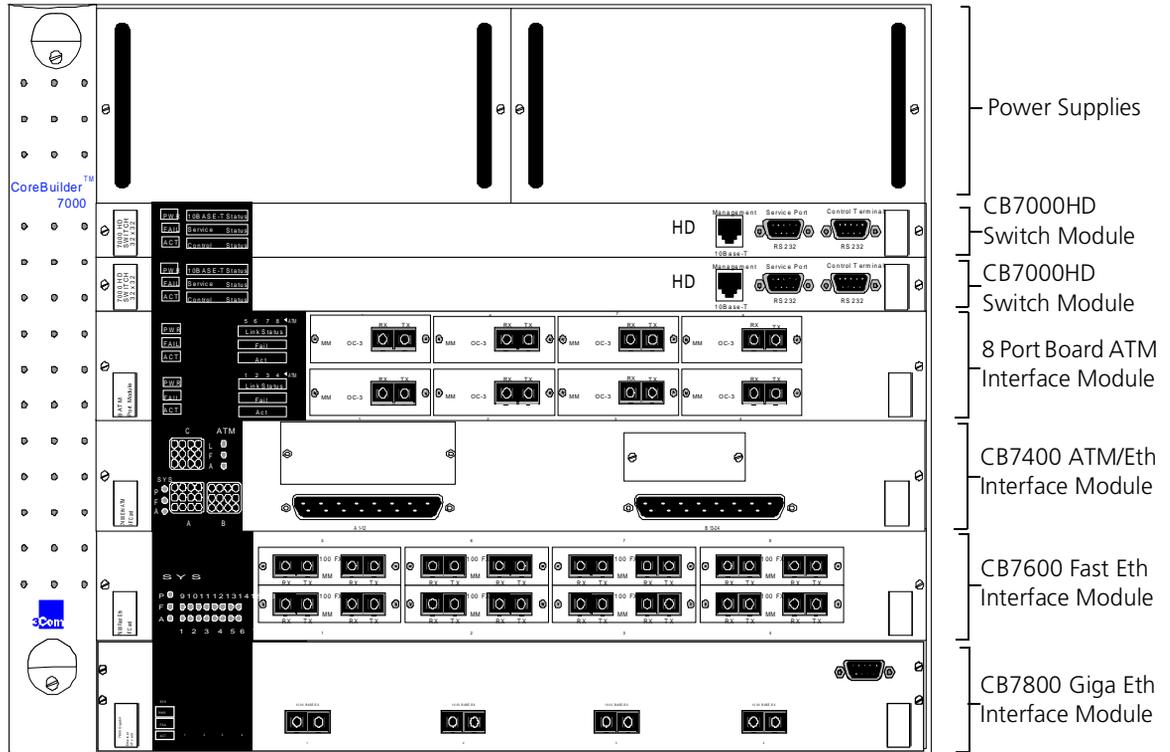
Figure 1-1   Components of the CoreBuilder 7000 Family ATM Switch

Enclosure	The housing for the CoreBuilder 7000 family ATM switch contains 2 slots for switching modules and 4 slots for interface cards, 2 places for power supplies and a ventilator fan tray. The high speed ATM switching backplane is located inside the back of the surrounding enclosure.
Power Supply	Located at the top of the front panel. The unit is switched on and off simply by connecting and disconnecting the power cord on the face of the power supply unit. A second power supply may be installed for redundancy.

Switching Module   The two slots just under the power supply contain switching modules, one slot for the active switching module and one slot for the redundant switching module.

The switching module is the core switching engine of the CoreBuilder 7000 family ATM switch, controlling and monitoring passive backplane and ATM activity. The switching module has a control port for connection to a terminal, a management port for connection to a network management station, and a service port for use by 3Com technicians.

Interface Module   The next four slots contain interface modules. These can be of many different types; some are shown in the figure (see the *CoreBuilder 7000 Family ATM Switches User Guide* for details).

Fans   For ventilation a fan tray with 6 fans is located at the left side of the unit.

Installing the CoreBuilder 7000 Family ATM Switch

You install the CoreBuilder 7000 family ATM switch in the stages shown Table 1-1.

Table 1-1   Installing the CoreBuilder 7000 Family ATM Switch

Installation Stage	Chapter
1 Unpacking the CoreBuilder 7000 family ATM switch	2
2 Installing the CoreBuilder 7000 family ATM switch chassis either on table-top or in a distribution rack	4
3 Installing a main and redundant power supply module in the CoreBuilder 7000 family ATM switch chassis	5
4 Installing a main and redundant switch module in the CoreBuilder 7000 family ATM switch chassis	5
5 Setting up switch module hardware redundancy and LANE redundancy	5
6 Installing 4-Port interface modules in the CoreBuilder 7000 family ATM switch chassis	5
7 Installing or replacing other interface modules in the CoreBuilder 7000 family ATM switch chassis	See respective manual
8 Installing or replacing the fan tray	5
9 Connecting to network devices, ATM optical interface, control terminal, Ethernet port and power source	5

Starting up the CoreBuilder 7000 Family ATM Switch

You power-on and configure the CoreBuilder 7000 family ATM switch in the stages shown in Table 1-2.

Table 1-2   Powering-on and Configuring the CoreBuilder 7000 Family ATM Switch

Stage		Chapter
1	Powering up the CoreBuilder 7000 family ATM switch	6
2	Understanding system states and switching module LEDs	6
3	Logging in to the LMA	7
4	Configuring the CoreBuilder 7000 family ATM switch by the Integrated Fast Setup procedure	7
5	Performing additional configuration of the CoreBuilder 7000 family ATM switch by individual LMA commands	7
6	Viewing network statistics	7

Redundancy in the CoreBuilder 7000 Family ATM Switch

The CoreBuilder 7000 family ATM switch is designed to meet the requirements of environments where network interruptions cannot be tolerated. The CoreBuilder 7000 family ATM switch platform has a fully redundant design, with dual load-sharing power supplies and redundant switching engines. All CoreBuilder 7000 family interface cards and switching engines are hot swappable to ensure continuous operation during configuration and servicing.

For information about determining the required power supply for various CoreBuilder 7000 family ATM switch installations and providing redundancy for various power loads see "Redundant Power Supply" on page 7-1.

For information about using the redundant switching module see "Redundant Switching Module" on page 7-9.

In addition to hardware redundancy, the CoreBuilder 7000 family ATM switch also provides redundant LANE services which are managed by the Transcend Network Management System. Each switch contains a complete set of LES and LECS functionality. In case of failure, LANE services can be transferred to another CoreBuilder 7000 family ATM switch elsewhere in the network.

Troubleshooting   This manual contains a number of troubleshooting procedures for solving common problems. For information about troubleshooting, see Chapter 8.

2

UNPACKING INSTRUCTIONS

This chapter describes how to unpack the CoreBuilder™ 7000 family ATM switch and contains the following topics:

- Unpacking the CoreBuilder 7000 Family ATM Switch.
- Taking Inventory

Unpacking the CoreBuilder 7000 Family ATM Switch

Before unpacking the CoreBuilder 7000 family ATM switch, examine it carefully for any signs of damage. After unpacking the system as described below, you may begin the appropriate installation procedure in Chapter 3.

If there are any visible signs of damage to the system packaging, do not begin installation. Contact 3Com Technical Support or your distributor for assistance.

To unpack the CoreBuilder 7000 family ATM switch, follow these instructions:

1 Remove the clips that attach the shipping container to the shipping tray of the packaging. The clips are located on opposite sides of the shipping container (two per side).

2 Slowly lift the shipping container off the shipping tray. The device is now visible.

3 Remove the accessory box and the mounting brackets from the top foam. The mounting brackets are recessed into the foam.

4 Lift the top foam off the device.

5 Two persons are required for this step. With each person grasping the hand-hold of the sling with one hand and holding the side of the system with the other hand, slowly pull the device out of the foam and place it where desired.

i *Save the packaging in the event that you must return the CoreBuilder 7000 Family to 3Com or your distributor.*

Taking Inventory

The CoreBuilder 7000 family ATM switch package should contain the items described in the following list. Check these items against the packing slip. Contact 3Com Technical Support at 1-800-992-2446 if any item is missing.

- 1 CoreBuilder 7000 family ATM switch

- 1 two volume documentation set (includes: *CoreBuilder 7000 Family ATM Switches Installation & Startup Guide* and *CoreBuilder 7000 Family ATM Switches User Guide)*

- 1 hardware kit including:

  - 1 pair of mounting brackets (for distribution rack installation)

  - 10 screws, M4 x 8 Phillips (for mounting brackets)

  - 4 rubber feet (for table installation)

  - 4 screws, M4 x 8 Phillips (for rubber feet)

- 1 or 2 power cord(s) (2.5 meters each)

  - 1 strain relief bracket per power cord

  - 3 screws, M3 x 8 Phillips

i *Optional accessories that you ordered with your system may be shipped separately.*

Check the packing slip for other items that you ordered.

3

INSTALLING A COREBUILDER 7000 FAMILY ATM SWITCH

This chapter contains instructions for installing the CoreBuilder™ 7000 family ATM switch on a table top or in a distribution rack and making the necessary hardware connections. The topics covered in this chapter include:

■ Safety Precautions

■ Preparation

■ Table Top Installation

■ Distribution Rack Installation

Safety Precautions

Read the following safety precautions carefully to reduce the risk of electric shock and fire.

- All servicing should be undertaken ONLY by qualified service personnel. There are no user serviceable parts inside the unit.

- The CoreBuilder 7000 family ATM switch internal power supply provides for automatic selection of either 100-120 VAC or 200-240 VAC, 60/50 Hz, as indicated on the safety label adjacent to the power inlet. ENSURE that the available voltage supply at the mains is within one of these two ranges.

- DO NOT operate the unit in a location where the maximum ambient temperature exceeds 40 degrees C.

- Ensure that the chassis ventilation openings in the unit are NOT BLOCKED.

- DO NOT plug in, turn on or attempt to operate an obviously damaged unit.

- Unplug the power supply cord from the wall socket BEFORE attempting to remove and/or replace the power supply.

- The system has a redundant power supply option. Disconnecting one power supply cord disconnects one power supply module only. To isolate the unit completely from the mains, disconnect all power supply cords.

Vorsichtsmaßnahmen

Lesen Sie die folgenden Vorsichtsmaßnahmen sorgfältig, um das Risiko von Stromschlag oder Brandgefahr zu vermindern.

- Jede Wartung sollte NUR von befugtem Wartungspersonal durchgeführt werden. Das Aggregat enthält keine vom Anwender zu wartenden Teile.

- Das interne Netzteil des CoreBuilder 7000 family ATM switch ermöglicht automatische Wahl von 100-120 V AC oder 200-240 V AC, 60/50 Hz, wie auf dem Sicherheitsetikett beim Netzeingang vermerkt. VERGEWISSERN SIE SICH, daß der vom Netz gelieferte Strom einer von diesen beiden Spannungsbereichen entspricht.

■ Nehmen Sie das Gerät NICHT in Betrieb, falls die Temperatur der Umgebung 40 Grad C übersteigt.

■ Gehen Sie sicher, daß die Lüftungsöffnungen am Gehäuse NICHT BLOCKIERT sind.

■ Eine offensichtlich schadhafte Einheit soll weder angeschlossen, eingeschaltet noch in Betrieb genommen werden.

■ Ziehen Sie das Netzkabel aus Steckdose an der Wand, BEVOR Sie versuchen, das Netzteil zu entfernen und/oder zu ersetzen.

■ Das System verfügt über ein wahlweises Ersatzstromaggregat. Das Trennen der Verbindung eines Netzkabels unterbricht die Verbindung nur mit einem Netzteil-Modul. Um das Gerät völlig vom Stromnetz zu trennen, müssen alle Netzkabel gelöst werden.

Mesures de sécurité

Lire attentivement les mesures de sécurité afin de réduire les risques d'électrocution et d'incendie.

■ Le service après-vente ne devra être effectué que par un personnel qualifié. Aucune pièce de l'unité ne peut être réparée par le simple utilisateur.

■ Le CoreBuilder 7000 family ATM switch d'alimentation interne permet une sélection automatique de 100 -120 VAC ou 200-240 VAC, 60/50Hz comme stipulé sur le label de sécurité placé près de l'ouverture d'alimentation. Veiller à ce que le voltage du secteur soit bien compris entre les valeurs mentionnées ci-dessus.

■ Ne pas faire fonctionner l'unité dans un endroit où la température ambiante maximale dépasse 40 degrés C.

■ Ne jamais essayer de brancher, allumer ou faire fonctionner une unité apparemment endommagée.

■ S'assurer que les ouvertures de la ventilation du chassis de l'unité ne sont pas bloquées.

■ Débrancher le fil d'alimentation au secteur de la prise murale AVANT d'essayer de déplacer ou de remplacer l'unité d'alimentation.

■ Le système dispose d'un système redondant d'alimentation au secteur. Le fait de débrancher l'une des sources d'alimentation ne débranche que l'un des modules d'alimentation au secteur. Pour isoler

entièrement l'unité de toute alimentation, débrancher tous les câbles d'alimentation.

Preparation

Before beginning the installation procedures in this chapter, ensure that the CoreBuilder 7000 family ATM switch is placed close to the location where it will be installed and that the mounting brackets and hardware kit supplied with the system are readily available. You will also need a No. 2 Phillips screwdriver.

The hardware kit contains:

- 1 pair of mounting brackets (for distribution rack installation)
- 10 screws, M4 x 8 Phillips (for mounting brackets)
- 4 rubber feet (for table installation)
- 4 screws, M4 x 8 Phillips (for rubber feet)

Table Top Installation

The CoreBuilder 7000 family ATM switch is ready for table top installation as shipped.

To provide a firmer base for the unit, you can choose to attach four rubber feet to the switch chassis. Use the rubber feet and the four M4 x 8 Phillips screws included in the hardware kit.

To insert the power supply, switching modules, and interface cards, configure optical ports for the interface modules and connect network cabling and power to the unit see Chapter 4.

Distribution Rack Installation

You can mount the CoreBuilder 7000 family ATM switch in a 19-inch distribution rack. This section describes how to prepare the unit and the distribution rack, and mount the unit in the distribution rack. Please read all of the instructions carefully before beginning the installation.

For the basic mechanical and space requirements for the distribution rack "Distribution Rack Requirements" on page C-3.

Unit and Rack Preparation   To prepare the CoreBuilder 7000 family ATM switch and distribution rack for installation:

1 Attach the mounting brackets onto the sides of the CoreBuilder 7000 family ATM switch using the mounting bracket screws (M4 x 8 Phillips).

2 Determine whether or not the distribution rack has threaded holes. If the holes are threaded, "Mounting the CoreBuilder 7000 Family ATM Switch" on page 3-6.

3 If the holes are not threaded, you must insert "G" clips. To determine where to insert "G" clips, locate the top of a universal mounting hole pattern on the left mounting rail. In the universal rail pattern, the spacing between holes is 1/2 inch, 5/8 inch, 5/8 inch, and 1/2 inch. To find the top of the pattern, locate the midpoint between any two holes that are spaced half an inch apart. Figure 3-1 shows the universal mounting hole pattern.
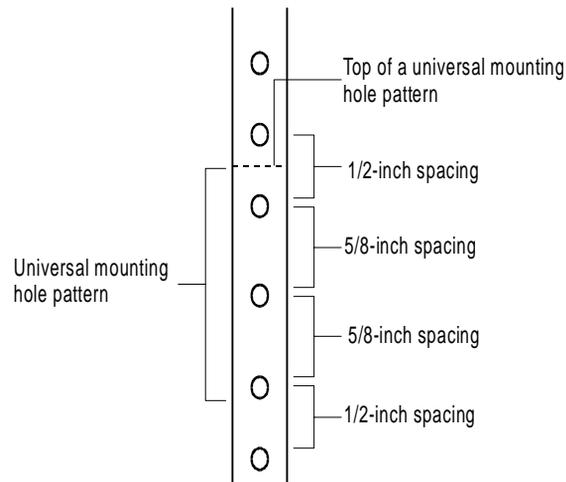
Figure 3-1   Universal Mounting Hole Pattern

4 From the top of the universal mounting hole pattern, insert "G" clips in the holes designated for the unit model.

5 Repeat steps 3 and 4 for the right rail. Ensure that you start on the same hole space.

You are now ready to mount the CoreBuilder 7000 family ATM switch into the distribution rack.

Mounting the CoreBuilder 7000 Family ATM Switch

Once the distribution rack is ready, you can mount the CoreBuilder 7000 family ATM switch into the rack.

To mount the CoreBuilder 7000 family ATM switch into the distribution rack:

1 Carefully lift the CoreBuilder 7000 family ATM switch into place, aligning the mounting brackets to the holes you have designated for mounting.

A fully-configured CoreBuilder 7000 family ATM switch weighs 43 pounds as shipped. To avoid personal injury, do not lift the unit without assistance.

2 While holding the CoreBuilder 7000 family ATM switch in place, firmly insert the mounting screws (10/32 x 1/2 Phillips) into the mounting holes on both sides of the rack.

The unit is now installed in the distribution rack.

To insert the power supply, switching modules, and interface cards, configure optical ports for the interface modules and connect network cabling and power to the unit see Chapter 4.

4

INSTALLING AND CONNECTING COREBUILDER MODULES

This chapter describes how to install and replace the CoreBuilder™ 7000 family modules. The following modules are covered.

- Power Supply Module
- Switch Module
- 4-Port Interface Module
- Fan Tray
- Connecting to Network Devices

The installation procedures of the other modules of the CoreBuilder 7000 family modules are described in their respective User Guides.

This chapter also describes how to connect the CoreBuilder 7000 family ATM switch to network devices.

Safety Precautions

⚠ *When handling replacement parts, 3Com recommends that you always use a wrist strap connected to a proper ground. This helps prevent the module from being damaged by electrostatic discharge. Additionally, when not in use, the module should be stored in an antistatic bag.*

⚡ *If the system is powered on when you are replacing a module, do not insert any metal objects, such as a screwdriver or a finger with jewelry, in the open slot. This could cause burns or other bodily harm, as well as system damage.*

Vorsichtsmaßnahmen

⚠ *Wenn Sie Ersatzteile handhaben, benutzen Sie immer ein Band am Handgelenk, daß gut geerdet ist. Das hilft vermeiden, daß das Ersatzteil durch elektrostatische Entladung beschädigt wird. Darüber hinaus sollte ein Modul, wenn nicht benutzt, in einem antistatischen Beutel aufbewahrt werden.*

⚡ *Steht das System unter Strom, wenn sie ein Modul installieren oder auswechseln, führen Sie keine Metallgegenstände, wie einen Schraubenzieher oder einen Finger mit Schmuck in den offenen Schlitz ein. Das könnte zu Verbrennungen oder anderen Körperschäden führen, sowie auch zu Schäden am System.*

Mesures de sécurité

⚠ *Lors de la manipulation des pièces de rechange, 3 Com recommande de toujours utiliser une bande attachée au poignet et reliée à la terre. Cela aidera à éviter que la pièce ne soit endommagée par une décharge électrostatique. De plus, lorsqu'il n'est pas utilisé, le module doit être conservé dans un emballage antistatique.*

⚡ *Si le système est alimenté lors de l'installation ou du remplacement d'un module, ne jamais insérer d'objet métallique tel qu'un tourne-vis ou un doigt portant un bijou dans la fente. Cela est susceptible de provoquer brûlures ou autres dommages corporels, et d'endommager le système.*

Power Supply Module	The CoreBuilder 7000 family ATM switch provides a dual load-sharing power supply capability where the second unit can serve as a redundant power supply. For more information, see "Redundant Power Supply" on page 7-1.

![i] *For certain combinations of installed interface cards, the second power supply cannot be used as a redundant supply (see "Providing Redundancy for Various Power Loads" on page 7-6).*

This section discusses the following topics:

- Installing a Power Supply Module
- Replacing a Redundant Power Supply Module

Installing a Power Supply Module   To install a power supply module:

1 Orient the module so that its sides enter the guides on either side of the chassis slot.

2 Slide the module into the chassis until the face panel is flush with the enclosure.

3 Secure the screws on either side of the front panel.

4 If a redundant power supply is not installed in the second power supply slot, cover the slot with a blank panel for safety.

Replacing a Redundant Power Supply Module   This section describes how to replace a redundant power supply module. You can replace the redundant power supply without having to turn off the system (hot-swap). For more information on the operation of the redundant power supply module, see "Redundant Power Supply" on page 7-1.

To replace a redundant power supply module:

1 Disconnect the power cord from the power supply.

2 Loosen the screws at the extreme right and left of the power supply, near the handles (refer to Figure 4-1).

3 Grasp the handles of the redundant power supply you want to replace and pull them outward. This ejects the power supply.

4 Remove the new power supply from its antistatic bag. Place the old power supply in the antistatic bag and set it aside in a safe place.

5 Orient the power supply so its labelling is upright.

6 Insert the power supply into the chassis by placing it between the guides of the slot and sliding it until it stops.

7 Tighten the power supply's securing screws.

8 Connect the power cord to the power supply.

Inserting the power supply
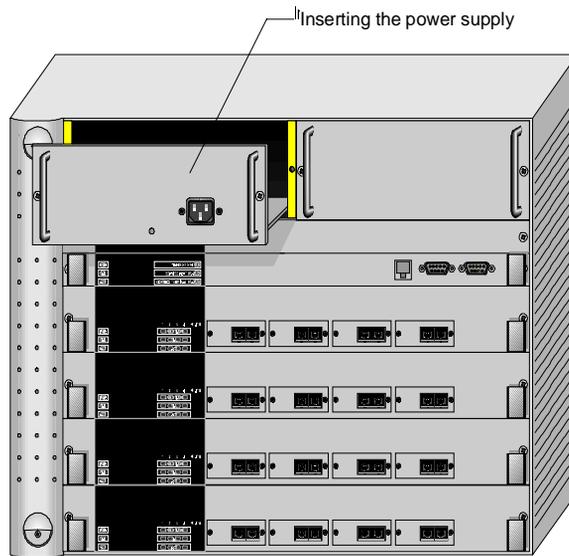
Figure 4-1 Hot-Swapping a Redundant Power Supply

Switch Module

The CoreBuilder 7000 family ATM switch provides for a redundant switch module to ensure continued operation should the main switch module fail. For more information on the operation of the redundant switch module, see "Redundant Switching Module" on page 7-9.

This section includes the following topics:

- Installing a Switch Module

- Replacing a Switch Module

- Setting up Switch Module Redundancy

- Setting up Switch Module Hardware Redundancy

- Setting up Switch Module Redundancy and LANE Redundancy

Installing a Switch Module

To install a switch module in the CoreBuilder 7000 family ATM switch chassis:

1 Remove the new card from its antistatic bag.

2 Orient the card so its labelling is upright and make sure the inject handles are in the outward position.

3 Insert the card into the chassis by placing it between the guides of the selected slot and sliding the card until it stops.

4 Grab both inject handles and push them inward. This locks the card into the chassis. You may have to apply considerable pressure to the handles. An audible "click" indicates that the connectors have engaged.

5 Tighten the card's securing screws. You are now ready to connect cables to the appropriate ports.

Replacing a Switch Module

To hot-swap the switch module:

1 Disconnect the cables from the card's ports. Ensure that there is a record of where the cables are attached so that you can correctly re-connect them to the new card.

2 Loosen the screws at the extreme right and left of the card, near the insert/eject handles.

3 Grasp the insert/eject handles of the card you want to replace and push them outward. This ejects the card. You may have to apply considerable force to the handles. You will hear a "click" to indicate that the connections have separated, and the card will slide slightly forward out of the CoreBuilder chassis.

4 Remove the new card from its antistatic bag. Place the old card in the antistatic bag and set it aside in a safe place.

5 Orient the card so its labelling is upright and make sure the inject handles are in the outward position.

6 Insert the card into the chassis by placing it between the guides of the selected slot and sliding the card until it stops.

7 Grab both inject handles and push them inward. This locks the card into the chassis. You may have to apply considerable pressure to the handles. An audible "click" indicates that the connectors have engaged. Verify that the card has been properly installed by observing its LEDs.

8 Tighten the card's securing screws.

9 Connect cables to the appropriate ports.

Inserting an interface card
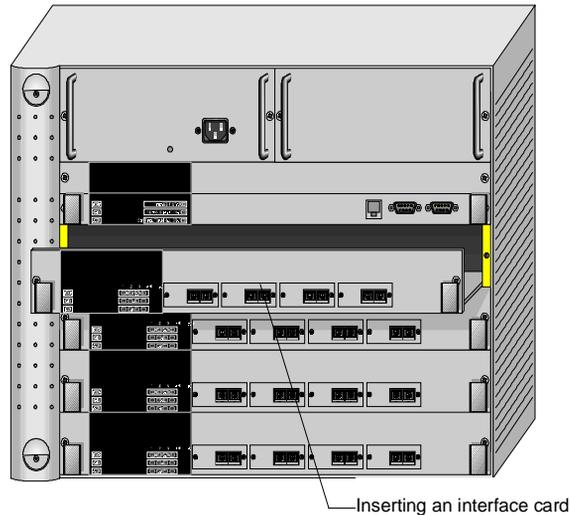
Figure 4-2   Hot-Swapping a Switch Module or Interface Module

Setting up Switch Module Redundancy

This section describes procedures for installing and setting up both a main and redundant switch module together.

Two different setup procedures are described. The first procedure covers setting up the main and redundant switch module *hardware redundancy* without setting up LANE redundancy. This procedure only requires operating the Local Management Application (LMA). The LMA is described in the *CoreBuilder 7000 Family ATM Switch User Guide*. The second procedure sets up the main and redundant switch module hardware redundancy as well as LANE redundancy. It requires both the LMA and the Transcend Enterprise Manager.

There are two situations where you would use the procedures of this section:

1 The initial installation of main and redundant cards.

2 The main card in the first slot has failed and the redundant card in the second slot has taken over as the main card. The failed card in the first slot has been replaced by a new card and this new card is now the redundant one.

Setting up Switch Module Hardware Redundancy

Use the following procedure to set up the switch module hardware redundancy.

1 Designate and mark the main and redundant switch modules.

2 Insert the switch module you marked as "redundant" in slot 2. Do not insert the switch module you marked as "main" yet.

3 Turn on the CoreBuilder 7000 family ATM switch.

The switch module in slot 2 becomes active.

4 Run the Integrated Fast Setup procedure (see "Integrated Fast Setup" on page 6-3) using the LMA command
(9) FST

5 Insert the main switch module in slot 1.

6 Wait five minutes for configuration information to pass between the two switch modules (see "Switching Module Configuration Database" on page 7-10 for a list of configuration items that pass between the switch modules).

7 Reboot the CoreBuilder 7000 family ATM switch using the LMA menu sequence:
(1) SYS / (7) RBO.

The switch module in slot 1 becomes active.

8 Verify main and redundant switch module status using the LMA command
(1) SYS / (4) SWM

You should see the following display.

Slot id	Slot status	Switch type	Switch mode	Memory size
1	Occupied	32X32 ATM switch	Active	16M
2	Occupied	16x16 ATM switch	Redundant	8M

9 Run the Integrated Fast Setup procedure using the LMA command
(9) FST to verify the configuration in the main switch module.

10 Add the following configuration information that did not pass between the switch modules in step 6 (see "Switching Module Configuration Database" on page 7-10).

■ LECS topology database (including: LES list and addresses, ELAN names, connection type)

■ Static ATM addresses

■ PVC configurations, UNI version, UNI profile, signaling.

The switch is now operational.

Setting up Switch Module Redundancy and LANE Redundancy

This section presents a procedure for setting up both switch module hardware redundancy and LANE redundancy in the same session. Both the LMA and the Transcend Enterprise Manager are used.

General Description of the Procedure

The following is a general description of the procedure for orientation purposes only. When you perform the procedure, use the detailed steps in the following sections.

1 Install both switches in chassis and run RESETCFG.BAT on each one. Connect Ethernet ports of each switch module and install at least one interface card in the chassis.

2 Configure the first switch using the Integrated Fast Setup of the LMA and do not reboot the switch in the Integrated Fast Setup.

3 Reboot the switch after one minute using the LMA menu.

4 Answer "no" to the prompt "Erase the setup parameters?" and use the LMA to check that all configuration parameters (i.e., database, IP, NNI etc.) have passed successfully to the second switch module.

5 Configure LANE redundancy in the first switch using the Transcend Backbone and Services Setup window and close the window when finished.

6 Reboot the switch after one minute

7 Configure LANE redundancy in the second switch module using the Transcend Backbone and Services Setup window and close the window when finished.

8 After one minute use the MIB browser to check the LECS order list and the Backbone and Services Setup window to check the LECS database.

9 Reboot the box.

10 Check the second switch using the MIB browser to check the LECS order list and the Backbone and Services Setup window to check the LECS database.

Preparatory Steps

Carry out the following preparatory steps.

1 Install main and redundant switch modules in the switch module slot 1 and slot 2 respectively (see "Installing a Switch Module" on page 4-5). Do not run the Integrated Fast Setup yet.

Each time the switch is rebooted during this procedure the cards change roles. The main card becomes the redundant card and vice versa. The main card can always be identified by its ACT LED flashing once every two seconds. The ACT LED of the redundant card flashes at a lower rate.

2 Verify that at least one interface card of any type is installed in the CoreBuilder chassis in any interface card slots 3-6. Data is transferred between switch modules via a communications chip on an interface card.

3 Verify that the Ethernet management ports in both switches are connected to the NMS station. They can either be connected through a hub to the NMS station or through an Ethernet interface card in the same chassis, such as the CoreBuilder 7400 High Density Ethernet/ATM interface card, to the NMS station.

During the procedure you will need to verify connectivity between the NMS station and the switch by pinging the switch module from the NMS station.

Connectivity between the switch module and its attached devices is established by an RARP transmitted by the switch module when it boots. The RARP causes a device to learn the MAC address of the switch module. However, there are certain devices, for example, a Solaris station, which will not learn a new MAC address for an IP when one already exists. If you are using one of these devices as an NMS station, and you are unable to ping the switch module, try erasing the switch module's MAC address from the device's ARP table and ping again.

4 Verify that the RS-232 terminal line is connected to the console port on the main switch module.

Procedure Execution

1 Reset the configuration of both switch modules by executing the RESETCFG.BAT file supplied with your software.

Do not use the LMA menu (1) SYS / (2) RES to reset the switch module configuration.

To execute the RESETCFG.BAT file proceed as follows:

a Perform the LMA command (1) SYS / (3) LOA / (3) LCL / 1 to put the system in Load Mode: Load.

b Reboot the switch using the LMA menu command: (1) SYS / (7) RBO. The switch will reboot in debug mode.

c Transfer the RS-232 cable to the service port of the main switch module.

d From a DOS window on the LMA terminal execute

> `resetcfg  com   speed`

where "com" is the communications port you are using and "speed" is 115200 for a CoreBuilder 7000HD switch module and 57600 for a CoreBuilder 7000 switch module.

e Transfer the RS-232 cable to the service port of the redundant switch module.

f Repeat step d)

g Transfer the RS-232 cable to the console port of the main switch module.

Switch Module Redundancy Setup

2 Set up the main switch module using the Integrated Fast Setup (see "Integrated Fast Setup" on page 6-3). Do not reboot the switch from the Integrated Fast Setup procedure (answer "no" to the prompt).

The main menu appears.

3 Wait for one minute to allow the configuration data to transfer from the main switch module to the redundant switch module.

4 Reboot the switch using the LMA menu sequence: (1) SYS / (7) RBO. This causes the configuration data to be recorded in flash memory and also causes the redundant switch module to become the main switch module.

5 After the switch reboots, answer "no" to the prompt: "Do you wish to erase the setup parameters".

6 Run the Integrated Fast Setup procedure as in step 2) to verify that the setup parameters have been transferred correctly to the second switch (the Integrated Fast Setup procedure now displays the setup parameters resident in the second switch module). Press Enter repeatedly to verify these parameters; do not enter new values.

7 Verify that the ELAN names in the LECS database are identical in both switch modules. Use menu item (2) LEM/(1) LCS/(5) LNT to check that the LECS database of the second switch includes the ELAN name of the first switch. For example, Elan6666_0 - Elan6666_15

LANE Redundancy Setup

8 Verify connectivity between the switch module and the NMS station by pinging the switch module from the NMS station.

9 Load the Transcend application and open the Wizard Tool from the ATMvLAN tool bar

10 Open the Backbone and Services Window.

11 Configure the LECS order as desired and press the Apply button.

12 Configure the LECS database. Add all the primary and redundant ELAN names desired to the LECS database and press Apply. Make a list of the ELAN names you have selected. You will need them for setting up the other switch module.

13 When finished, close the Backbone and Services window.

14 Wait one minute to allow the LECS order database to transfer to the other switch module.

The LECS ELAN database does not transfer automatically.

15 Reboot the switch using the LMA menu sequence: (1) SYS / (7) RBO. The purpose of this step is to make the first switch module active in order to set up the LANE services there.

16 After the first switch boots, check its connectivity with the NMS station as in step 8).

17 Perform steps 10) and 12) using the same list of ELANs.

18 Wait one minute.

Verifying LANE Redundancy Setup

19 Use the MIB browser under the Transcend tools menu and browse through the MIB to verify that all the information regarding the LECS order list has been transferred correctly.

Look in the following MIB location:

- private.
- enterprises.
- atmForum.

- atmForumNetworkManagement.
- atmLanEmulation.
- elanMIB.
- elanLecsGroup.
- elanLecsConfGroup.
- lecsConfTable.
- lecsConfEntry.
- lecsAtmAddrSpec.

Press start query. The LECS order list is displayed on the bottom window.

20 Close the Backbone and Services Select window.

21 Open the Backbone and Services Select window again and use it to check that the LECS database is correct.

This item could be done through the LMA but it is preferred to do so through the NMS since the LMA will not show any redundant LES that exists.

22 Reboot the switch using the LMA menu sequence: (1) SYS / (7) RBO. The purpose of this step is to make the second card active in order to check the LANE services there.

23 After the second switch module boots, verify connectivity with the NMS station as in step 8).

24 Perform step 19) and 20) to verify LECS order.

25 Open the Backbone and Services Select window again and use it to check the LECS database is correct.

The hardware and LANE redundancy procedure is finished.

4-Port Interface Module	This section contains the following topics:

■ ATM Interface Daughter Cards

■ Installing the ATM Interface Daughter Cards

■ Installing a 4-Port Interface Module

■ Replacing a 4-Port Interface Module

ATM Interface Daughter Cards Each of the four ATM interface receptacles of the 4-Port ATM Interface module can be configured to support the following types of ATM daughter cards:

■ OC-3 multi-mode (MM) fiber link, single-mode (SM) fiber link

■ OC-3 Category 5 UTP

■ DS-3 coaxial cable

■ E-3 ATM 34.368 Mbits/sec WAN interface

Figure 4-3 shows the OC-3 daughter card.
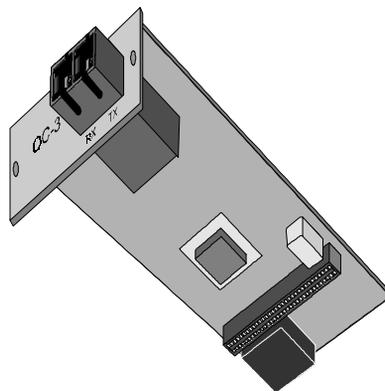
Figure 4-3   OC-3 Daughter Card

Figure 4-4 shows the E-3/DS-3 daughter card.
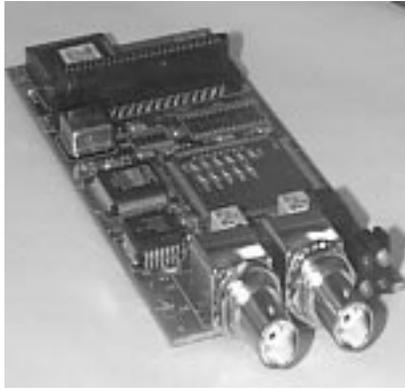
Figure 4-4   E-3/DS-3 Daughter Card

Installing the ATM Interface Daughter Cards

The 4-port ATM interface module can hold up to four ATM interface daughter cards. The installation procedure of the 4-port ATM interface module comprises two stages. First, you install the ATM interface daughter cards in the 4-port ATM interface module. Then, you install the 4-port ATM interface module into the CoreBuilder 7000 family ATM switch chassis.

To install the ATM interface daughter cards perform the following procedure:

1 Select the individual daughter cards that are to occupy the interface card's four openings.

2 Align each module with the front panel aperture as shown in Figure 4-5 and press down to engage the strip connectors on the underside of the module. Three screws anchor each module to its seat on the interface card. Interface openings reserved for future use should be covered with blank panels. Used interfaces should use the coax or optical panels as covers.
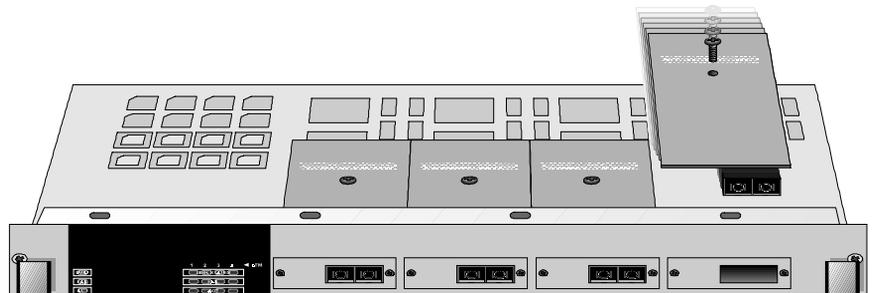
Figure 4-5   4-Port ATM Interface Module

Installing a 4-Port Interface Module

When the ports of the interface module have been fitted with the appropriate daughter card, you install the 4-Port interface module into the CoreBuilder 7000 family ATM switch chassis.

To install the 4-port interface module:

1 Orient the interface module so its labelling is upright and make sure the inject handles are in the outward position.

2 Insert the card into the chassis by placing it between the guides of the selected slot and sliding the card until it stops.

3 Make sure the card sits in the guide slots on either side. Be sure that the loose screws do not interfere with card insertion.

4 Grab both inject handles and push them inward. This locks the card into the chassis. You may have to apply considerable pressure to the handles. An audible "click" indicates that the connectors have engaged.

5 Tighten the card's securing screws. You are now ready to connect cables to the appropriate ports of the module.

Replacing a 4-Port Interface Module

To replace individual daughter cards, or to replace the entire interface module:

1 Disconnect the cables from the card's ports. Ensure that there is a record of where the cables are attached so that you can correctly re-connect them to the new card.

2 Loosen the screws at the extreme right and left of the card, near the insert/eject handles.

3 Grasp the insert/eject handles of the card you want to replace and push them outward. This ejects the card. You may have to apply considerable force to the handles. You will hear a "click" to indicate that the connections have separated, and the card will slide slightly forward out of the CoreBuilder chassis.

4 If you are replacing the entire interface card, remove the new card from its antistatic bag. Place the old card in the antistatic bag and set it aside in a safe place.

Fan Tray

To replace the fan tray:

1 Loosen the screws at the top and bottom of the fan tray.

2 Pull the fan tray out of the chassis.

3 Remove the new fan tray from its antistatic bag. Place the old fan tray in the antistatic bag and set it aside in a safe place.

4 Orient the fan tray so its labelling is upright.

5 Insert the new fan tray into the chassis by placing it between the guides of the slot and sliding it until it stops.

6 Tighten the fan tray's securing screws.

Connecting to Network Devices

This section shows how to connect the CoreBuilder 7000 family ATM switch to various network devices.

Four types of connections are required:

- Connecting to an ATM Optical Interface
- Connecting the Control Terminal
- Connecting to the Ethernet Port
- Connecting to the Power Source

Connecting to an ATM Optical Interface

To connect a CoreBuilder 7000 family ATM switch port to another CoreBuilder unit, to a LinkSwitch 2700 ATMLink adapter, or to any device with an ATM optical interface:

1 Prepare an optical cable (Tx Rx). You may want to mark the ends of the cable so you can identify them.

2 Snap the cable into a CoreBuilder 7000 family ATM switch port in one of the interface modules.

3 Snap the other end of the cable into the selected optical interface of the other ATM device. Make sure that each wire connects to Rx on one end and Tx on the other.

4 Repeat steps 1-3 for all ATM port connections to the CoreBuilder.

Perform steps 1-4 above when connecting a DS-3 coax cable set (Rx and Tx).

Fiber Optic Power Budget of 3Com Products

Table 4-1 shows the power budget of various 3Com products. Use this table when you calculate the fiber optic cable you need to connect to the CoreBuilder 7000 family ATM switch. See fiber optic cable manufacturers data for more information.

Table 4-1 Fiber Power Budget for Various 3Com Products

Product	Mode (nm)	Min TX. O-Pwr (dBM)	Receiver Sens. (dBM)	Budget (dB)	Distance (KM)	Specification
4-Port/8-Port OC-3 MM	MM-1300	-19	-30	11	2	HP#:HFBR-5205
4-Port/8-Port OC-3 SM	SM-1300	-15	-33	18	15	SDX-1155B
CoreBuilder 7201 (ATM port)	MM-1300	-19	-30	11	2	HP#:HFBR-5205
CoreBuilder 7201 (ATM port)	SM-1300	-15	-33	18	15	SDX-1155B

Table 4-1 Fiber Power Budget for Various 3Com Products (continued)

Product	Mode (nm)	Min TX. O-Pwr (dBM)	Receiver Sens. (dBM)	Budget (dB)	Distance (KM)	Specification
CoreBuilder 7200F - Ethernet	MM-820	-7.6	-15.1	7.5		HP#:HFBR-2416TC HP#:HFBR-1414T
CoreBuilder 7600FX	MM-1300	-19	-31	12		HP#:HFBR-5103
OC-12	MM-1300	-19	-26	7	0.8	HP#:HFBR-5208
OC-12	SM	-15	-28	13	15	HP#:SDX-1622

Connecting the Control Terminal
The CoreBuilder 7000 family ATM switch can be configured via the LMA using the Administration Console terminal (VT100) or terminal emulator (Windows). To connect a terminal to the CoreBuilder 7000 family ATM switch control port:

1 Prepare an RS-232 shielded cable (9 pin-to-9 pin or 9 pin-to-25 pin, as dictated by the terminal you wish to use).

2 Configure the terminal: 19200 baud, 8 data bits, 1 stop bit, no parity, xon/xoff flow control.

3 Push the DCE side of the cable onto the Control port of the switch module and screw it into place.

4 Connect the other end of the cable to the terminal.

In case you have installed a redundant switch unit, it is sufficient to connect the RS-232 line to either the active switch control port or to the redundant switch control port.

Connecting to the Ethernet Port
The Ethernet port is used for connecting directly to a Transcend NMS terminal for management purposes.

In case you have installed a redundant switch module, its Ethernet port must also be connected directly to the Transcend NMS terminal.

Another way of connecting the Ethernet port to an out-of-band Ethernet network is to connect it to a CoreBuilder 7200 Ethernet/ATM Interface Card or a CB7400 High Density Ethernet/ATM Interface Card installed in the same chassis.

Connecting to the Power Source
This section describes how to connect the CoreBuilder 7000 family ATM switch to the power source.

Selecting a Power Cord

The following power cords and accessories are supplied with the unit:

■ 1 or 2 power cord(s) (2.5 meters each)

■ 1 strain relief bracket per power cord

■ 3 screws, M3 x 8 Phillips

The power cord supplied with the unit can be used with loads of up to 5 Amps AC.

If power cord(s) WERE NOT supplied with the unit, choose a cord based on the following information:

- For units installed in the USA or Canada: Select a flexible, three-conductor power cord that is UL-listed and CSA-certified, with individual conductor wire size of #18 AWG, and with a maximum length of 4.5 meters. The power cord terminations should be NEMA Type 5-15P (three-prong earthing) at one end and IEC appliance inlet coupler at the other end.

- Any of the following types are acceptable: SV, SVE, SVO, SVT, SVTO, SVTOO, S, SE, SO, SOO, ST, STO, STOO, SJ, SJE, SJO, SJOO, SJT, SJTOO, SP-3, SPE-3, SPT-3, G, W.

- For units installed in all other countries: Select only a flexible, three-conductor power cord, approved by the cognizant safety organization of your country. The power cord must be of the type HAR (Harmonized), with an individual conductor wire size of 0.75 sq.mm. The power cord terminations should be a suitably-rated earthing-type plug at one end and an IEC appliance inlet coupler at the other end. Both of the power cord terminations must carry the certification label (mark) of the cognizant safety organization of your country.

Plugging in the Unit

To plug in the unit:

1 Plug the power cord into the power source.

2 Plug the other end of the cord into the AC inlet located in the topmost section of the CoreBuilder 7000 family ATM switch front panel. Make sure the power cord is fully seated. A green power LED on the power supply should be lit. The unit is automatically powered up when the power cord is plugged in.

3 Make sure the fans are working. If the fans are not working, unplug the unit immediately and see "Fans do not rotate" on page 8-2.

5 **POWER-ON**

This chapter describes the system states of the CoreBuilder™ 7000 family ATM switch including power-on and some basic diagnostic information to help you verify normal operation of your CoreBuilder system.

This chapter includes the topics:

- System States
- System Power-on
- 4-Port Interface Module LEDs

System States

This section describes the different system states of the 8-Port Board and how they are indicated on the LED display.

The system states are:

- Power-on
- Normal operation
- Hardware fault
- Software fault
- No power to unit

System States and Switching Module LEDs

LED indicators are located on the front panels of the CoreBuilder 7000, its power supply, switching modules, and interface modules. These LEDs indicate the current system state of the CoreBuilder unit and its components. Front panel LEDs can be extremely useful in determining the cause of specific problems.

The system state in which the CoreBuilder 7000 unit is currently operating is displayed by the switching module system status LEDs. Referring to Figure 5-1, these are the three LEDs: PWR, FAIL, and ACT(ive) on the left side of the LED panel. Table 5-1 shows the correlation between the current system state and SYS LEDs display. For example, during normal operation the PWR LED is on, the FAIL LED is off and the ACT LED is flashing. The LEDs on the right side of the panel indicate the status of the Ethernet port, the Service port and the Control port.
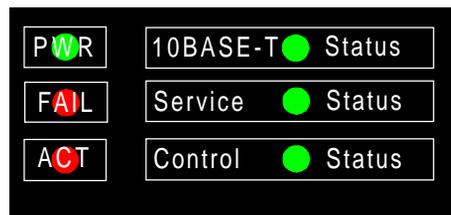
Figure 5-1 Switching Module LEDs

Table 5-1 CoreBuilder System States

System State	Power (green)	Fail (red)	Activity (yellow)	10BASE-T Status (green)	Service Port Status (green)	Control Terminal Status (green)
Power-on	On	Off	On	On	Flashing	Flashing
Normal operation	On	Off	Flashing	On	On	On
Hardware fault	On	On	Off	Off	Off	Off
Software fault	On	Off	Not flashing	Undetermined	Undetermined	Undetermined
No power to unit	Off	Off	Off	Off	Off	Off

The following table also provides information about the LED display of system states but is organized by system status LED.

Table 5-2 Description of Switching Module LEDs

LED	Color	Description	Source
PWR (Power)	Green	DC power input active.	Hardware
ACT (Activity)	Yellow	Should blink continuously when operational.	Software
FAIL	Red	CPU failure.	Hardware CPU or Watchdog
10BASE-T STATUS	Green	10BASE-T link OK. The Ethernet link is active.	Hardware Ethernet controller
SERVICE PORT STATUS	Green	RS232 service port link OK – should be blinking during power on.	Software
CONTROL TERMINAL STATUS	Green	RS232 control terminal port link OK – should be blinking during power on.	Software

System Power-on	This section describes the stages of system power-on of the CoreBuilder 7000 family ATM switch.

Software Loading and Diagnostics

Apply electrical power to the system by inserting the power cord in the power supply unit. The power supply indicator lights and the CoreBuilder 7000 family ATM switch automatically runs diagnostic software. This software verifies that every component in the system is fully functional before the system becomes active on the network. Diagnostics should take sixty seconds or less.

If any component fails power-on diagnostics, the system either fails to power on or it keeps faulty modules off-line. Once the system comes up, you can check to see which modules, if any, have failed diagnostics by checking the LED panels; in-depth information is available by viewing the system configuration screens on the administration console.

Indicators

All interface and switching unit indicators light at the start of the power-on diagnostic sequence, then go out briefly. General activity LEDs light up as the system checks the switching and interface modules. Finally, individual port indicators go on as the system discovers active connections residing on the interface modules. The 10BaseT indicator on the interface module is on during normal function, even if there is no active 10BaseT management link.

| **4-Port Interface Module LEDs** | Figure 5-2 shows the 4-port interface module LEDs. Table 5-3 and Table 5-4 list the permanent 4-port interface module panel LEDs. |

Figure 5-2   Interface Module LEDs

Table 5-3   Description of Interface Module LEDs

LED	Color	Description	Source
PWR (Power)	Green	DC power input active.	Hardware
FAIL	Red	CPU failure.	Hardware CPU or Watchdog
ACT (Activity)	Yellow	Should blink continuously when operational.	Software

Table 5-4   Description of Interface Module LEDs for Each Port

LED	Color	Description	Source
LINK STATUS	Green	ATM physical layer is connected and has no error.	Software
FAIL	Red	ATM interface port test failure.	Software
ACT (Activity)	Yellow	Reception and transmission of cells on ATM link – should flash to indicate traffic.	Software

E3/DS-3 Status LEDs   The E3/DS-3 status LEDs are found on the front panel of the E3/DS-3 piggy (Figure 5-3). Table 5-5 lists the LEDs of the E3/DS-3 piggy.
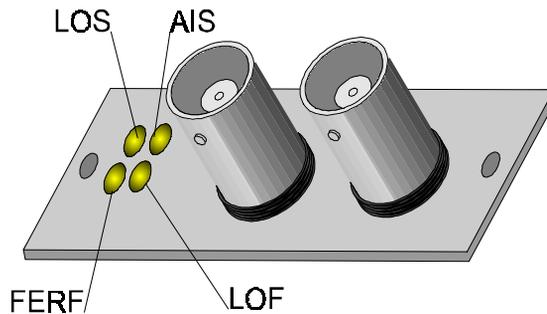
Figure 5-3   E3/DS-3 Status LEDs

Table 5-5   E3/DS-3 Status LEDs

LED	Color	Description
LOS Loss of Signal	Green	*On:* There is a signal on Rx (normal state).
		Off: No signal on Rx (problem with Rx).
FERF Far End Rx Failure Signal	Yellow	*On:* FERF in incoming frames (the peer reports about its Rx problem).
		Off: No FERF in incoming frame.
AIS Alarm Indication Signal	Blue	*On:* AIS signal is present for at least 5 sec. (the peer reports about its problem).
		Off: No AIS signal present for at least 5 sec. (normal state).
LOF Loss of Frame	Red	*On:* LOF is present for at least 5 sec. (problems with Rx).
		Off: No LOF for at least 15 sec.

6

CONFIGURING THE CORE BUILDER 7000 FAMILY ATM SWITCH

This chapter describes the initial configuration of the CoreBuilder™ 7000 family ATM switch. Using the terminal connected to the control port, you log into the system and assign network addresses to the CoreBuilder 7000 family ATM switch. This enables the management of the site to recognize and communicate with the CoreBuilder 7000 family ATM switch. You also specify ATM connections between addresses, using the ATM protocol you have selected.

The topics covered in this chapter include:

- Logging in to the LMA
- Integrated Fast Setup
- Additional Switch Configuration
- Viewing Network Statistics.
- Storing and Retrieving Configuration Parameters
- Loading Software and Configuration Data by Batch Utilities

Logging in to the LMA

When you boot the CoreBuilder 7000 family ATM switch the following login screen appears:

```
-------------------------------
-       CoreBuilder 7000       -
-                              -
-  ATM     Backbone   Switch -
-------------------------------
Access level (read, write, admin):admin
Password:
```

To login to the LMA:

1 Enter your access level (default is admin)

2 Enter your password

After a successful login the LMA Main Menu is displayed as shown in Figure 6-1.

```
   CB7000 switch module - Main Menu:
 ==========
(1) SYS: Platform config ->
(2) LEM: Lan Emulation ->
(3) CON: Connections ->
(4) STS: Statistics ->
(5) DIA: Testing & Diagnostics ->
(6) FTR: ATM features
(7) LOG: Logout
(8) VER: Version
(9) FST: Fast Setup
```

Figure 6-1 LMA Main Menu

Integrated Fast Setup	This section describes the Integrated Fast Setup procedure and contains the following topics:

- Setup Modes

- Setup Procedure Sections

- Entering Data

- Navigation Aids

- Integrated Fast Setup Operation

You use the Integrated Fast Setup procedure to configure the minimum set of parameters needed to enable the CoreBuilder 7000 family ATM switch and its attached devices to function in the network.

With this procedure you can configure both the CoreBuilder 7000 family ATM switch card and all CoreBuilder 7X00 interface cards installed in it in one session.

In certain cases you will need to use the Fast Setup procedure of individual CoreBuilder 7X00 interface cards, in addition to the Integrated Fast Setup procedure, to correctly configure your system.

This section presents the Integrated Fast Setup of the CoreBuilder 7000 family ATM switch card. It also explains when to use the Integrated Fast Setup of the CoreBuilder 7000 family ATM switch card and when to use the Fast Setup of an individual Corebuilder 7X00 interface card. For detailed information about how to use the Fast Setup of an individual Corebuilder 7X00 interface card see the User Guide of the specific interface card.

Chassis-oriented Setup

The Integrated Fast Setup procedure is based on the concept that the CoreBuilder 7000 family ATM switch chassis together with its installed interface cards is viewed as an integrated unit. The advantage of this point of view is its simplicity: it is not necessary to remember in which slot each interface card is installed or even which type of interface card is installed. Attention is focussed on configuring the ports of the chassis. The procedure automatically determines the ports that are available in the chassis and presents them by type (Ethernet, Fast Ethernet, ATM) for configuration. The port location is displayed by the notation <slot.port>. For example <3.1> refers to slot #3, port #1.

Chassis-wide vLANs

With the Integrated Fast Setup, Virtual LANs (vLANs) can be created across the entire chassis. vLANs are set up in two stages. First, in the LE Client section, a number of *potential* vLANs are created according to the requirement of the network. Next, in the Virtual Network Configuration section, the potential vLANs become actual vLANs by having ports assigned to them.

You need to define an administration "admin" vLAN to maintain SNMP connectivity to each device in the network. Using the Integrated Fast Setup you define one admin vLAN for the chassis; there is no need to define separate admin vLANs for each interface card.

Note that from software version 3.5 on, the "admin" vLAN can now be called by any other name providing the same name is used consistently in the CB7000 and in all installed CB7X00 interface cards. When using the Integrated Fast Setup, the name for the admin vLAN which is specified for the switch module will be automatically chosen for the other modules housed in the same CoreBuilder 7000 family ATM switch chassis, overriding any existing admin vLAN names.

Setup Modes
The Integrated Fast Setup provides two setup modes: the "Full" setup mode and the "Switch" setup mode.

Full Setup Mode

The Full setup mode configures both the CoreBuilder 7000 family ATM switch and the installed interface cards. It sets the required parameter values in all the installed interface cards. The Full setup mode presents only the most critical parameters; default values are assumed for the remaining parameters.

This method is recommended for most users, especially for initial setup.

Only those systems that require specific parameter settings in one or more of the installed interface cards will require the Switch setup mode described in the next section.

Switch Setup Mode

The Switch setup mode focuses only on the CoreBuilder 7000 family ATM switch and its ATM ports. The Switch setup mode is provided to allow you to retain special settings in the interface cards; it does not allow any of the installed interface card configurations to be changed. If you wish to

alter the settings in an interface card you can use the Fast Setup of that interface card after you are finished using the Switch setup procedure.

Setup Mode Selection

If one of the following situations is detected, the operator is prompted to choose between the Switch and Full setup modes:

- A Subnet Mask, Default Gateway or NMS Address different from that of the CoreBuilder 7000 family ATM switch

- A vLAN whose ATM connection is set to "No"

- The name of the ELAN to which the default admin port (Port #1 in each slot) is attached is not the same in all interface cards.

If none of these situations is detected, Full setup mode is automatically selected.

If Full setup is selected, the parameters in the interface cards revert to their default values.

Setting Special Parameters

If one or more individual interface cards requires one of the special situations referred to in the previous section or needs to remain unaltered, you need to do one of the following:

- Use the Switch setup mode of the Integrated Fast Setup to set up the CoreBuilder 7000 family ATM switch only and then use the Fast Setup of each installed interface card separately.

- Use the Full setup mode of the Integrated Fast Setup to configure the CoreBuilder 7000 family ATM switch and all installed interface cards and then use the Fast Setup for the particular interface card in order to restore its special parameter values.

Setup Procedure Sections   The Integrated Fast Setup procedure contains the following sections:

Table 6-1   Setup Procedure Sections

Setup Section	Description
1 Network Prefix	Set Network Prefix for CoreBuilder 7000
2 LE Parameters	Set LE Parameters for CoreBuilder 7000 (LECS and LES states)
3 LECS Address	Set resident active LECS address for CoreBuilder 7000

Table 6-1 Setup Procedure Sections (continued)

Setup Section	Description
4 FastBUS Configuration	Configure the FastBUS card if installed.
5 Interface Type	Set the interface type port parameters for CoreBuilder 7000
6 LE Client Configuration	Define potential vLANs by assigning names to ELANs. Exit this section by pressing Enter only.
7 Virtual Network Configuration	Assign chassis ports to potential vLANs.
8 Admin VN Management Configuration	Set up admin vLAN in all modules including setting IP address
9 Confirmation	Confirm setup

Entering Data The Integrated Fast Setup procedure runs sequentially through the relevant data for all of the sections, displaying a prompt for each data item and a default value. If you want to change the default, enter the desired value in place of the default. If you want to accept the default, press Enter.

Default Parameter Values

The default parameter value displayed at the prompt is the value stored in flash memory. In case there is no value in flash memory, the factory default value is displayed.

Navigation Aids Table 6-2 lists the short-cut characters you can use to move between sections of the Integrated Fast Setup procedure:

Table 6-2 Integrated Fast Setup Procedure Navigation Aids

Type:	To Go:
<	Back to previous section
>	To next section
>S	To section indicated by double-underlined identifier letter S in section title
\	Back to beginning of setup
$	To end of setup

Integrated Fast Setup Operation You initiate the Integrated Fast Setup from the LMA Main Menu of the Corebuilder 7000 family ATM switch (see Figure 6-1).

To begin the Integrated Fast Setup process, select the menu item:
(9) FST: Fast Setup

Note that the Integrated Fast Setup "Full" setup mode may override any specific configurations that have previously been carried out in any of the installed interface cards (see "Setup Modes" on page 6-4). The following warning message is displayed when this is about to occur:

```
***Note: Full fast setup, special module configuration will
be overridden.
```

The following message appears on the screen.

```
Now reading the modules configuration, please wait ...


  Special module configuration will be overridden by fast setup.
  continue full fast setup or only switch fast setup  (S<witch>, F<ull>): F

 ***Note: Full fast setup, special module configuration will be overridden.


Fast Setup Utility
==================

The flash configuration will be displayed below;
Update if needed, and then hit Enter.

To move between sections, enter the following characters at end of line:
< >  -  Back and forth in sections      >S   -   Jump to section ID S
\    -  Back to beginning of setup      $    -   To end of setup

Only in Virtual Network Configuration section (group=slot; item=port):
}G   -  Jump to group #G                +I   -   Jump to item #I
*    -  Update all group items          **   -   Update all section items
.T   -  Assign a VLT tag #T
```

Network Prefix Section   In this section you are prompted for the network prefix of the switch. Enter values as appropriate. The following example shows a typical network prefix configuration.

```
Network Prefix
=-------------


*** Note: Recommended Network Prefix ->
                         47.00.00.00.00.00.3c.00.00.a*
  Network Prefix(In HEX): 47.00.00.00.00.00.3c.00.00.a*
```

LE Parameters Section   In this section you are prompted to enable or disable the resident LECS and LES of the switch. Enter values as follows:

1 At the "Resident LECS state" prompt, enter **1** to enable the resident LECS or enter **0** to disable the resident LECS.

If you enter 1, the resident LES will be enabled automatically and no further prompt will be displayed. If you enter 0, the "LES state" prompt will be displayed.

2 At the "LES state" prompt, enter **1** to enable the resident LES or enter **0** to disable the resident LES.

The following example shows a typical LAN Emulation configuration.

```
LE parameters
=------------
  Resident LECS state (1-Enable, 0-Disable): 0
  LES state (1-Enable, 0-Disable): 1
```

LECS Address Section   This section prompts you for the ATM address of the LECS. Enter the user part of the LECS address; the network prefix is identical to the network prefix of the switch. The following example shows a typical LECS Address configuration:

```
LECS Address
--=---------
Resident LECS User Part(In HEX): 00.a0.3e.00.00.01.00

Active LECS addr - net prefix: 47.00.00.00.00.00.3c.00.00.a*
Active LECS addr - user part: 00.a0.3e.00.00.01.00
```

FastBUS Configuration Section This section prompts you to configure the FastBUS module. If no FastBUS module is installed, this section is skipped by the Integrated Fast Setup.

To configure the FastBUS:

1 At the prompt, enter **1** to enable the FastBUS module or enter **0** to disable it.

2 At the prompt, enter a number in the range **1-4** to select the capacity of Bank 1 from the list of four possibilities:

```
Options: 1-6*10MB/s
         2-3*20MB/s
         3-2*30MB/s
         4-1*60MB/s
```

The factory default is 4.

Your choice is displayed.

3 As in step 2, select the capacity of Bank 2.

4 For each of the 16 resident ELANs, enter a number in the range **0-2** to select the bank assignment for the ELAN from the list of three possibilities:

```
Options: 0 - Conventional
         1 - Bank 1 (1*60MB/s)
         2 - Bank 2 (1*60MB/s)
```

The factory default is 0.

Your choices are displayed.

The following is an example of the FastBUS configuration.

```
Fast BUS Configuration
=---------------------
  Fast BUS state (1-Enable, 0-Disable): 0 1

2 FastBUS banks available. Select bank's capacity:
Options: 1-6*10MB/s
         2-3*20MB/s
         3-2*30MB/s
         4-1*60MB/s
Bank 1, slot 4: 4
Bank 1 is configured: (1*60MB/s)
Bank 2, slot 4: 4
Bank 2 is configured: (1*60MB/s)

Fast BUS: ELAN assignments
-----=--------------------
Options: 0 - Conventional,
         1 - Bank 1 (1*60MB/s)
         2 - Bank 2 (1*60MB/s)
elan7674_0: 0
...
elan7674_15: 0
---------------------------------------------------------
|ELAN ID |ELAN Name                      |Capacity     |
|--------|-------------------------------|-------------|
| 1      |elan7674_0                     |Conventional |
| 2      |elan7674_1                     |Conventional |
| 3      |elan7674_2                     |Conventional |
| 4      |elan7674_3                     |Conventional |
| 5      |elan7674_4                     |Conventional |
| 6      |elan7674_5                     |Conventional |
| 7      |elan7674_6                     |Conventional |
| 8      |elan7674_7                     |Conventional |
| 9      |elan7674_8                     |Conventional |
| 10     |elan7674_9                     |Conventional |
| 11     |elan7674_10                    |Conventional |
| 12     |elan7674_11                    |Conventional |
| 13     |elan7674_12                    |Conventional |
| 14     |elan7674_13                    |Conventional |
| 15     |elan7674_14                    |Conventional |
```

Interface Type Section   This section prompts you for the ATM interface type configuration of the ports on the Interface Modules which are installed in the CoreBuilder 7000 family ATM switch chassis.

There are three interface types: UNI, E-IISP and IISP. The UNI type is normally used when an edge device is connecting to a switch, the E-IISP type is normally used when connecting to another CoreBuilder 7000 or 9000 switch, and the IISP type is used to connect to a device which does not recognize the E-IISP protocol used by the CoreBuilder 7000 family ATM switch such as switches of other vendors.

To enter the interface type configuration:

1 At the NNI type of port prompt, enter the NNI type for the port you just specified. Enter "U" for UNI, enter "E" for IISP, or enter "I" for IISP.

2 Repeat step 2 until you have specified the interface type for all of the ports that are in the Corebuilder 7000 family ATM switch chassis.

```
  Interface type
=--------------
  NNI type of port <3.1> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.2> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.3> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.4> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.5> (U<NI>, E<IISP>, I<ISP>): E
  NNI type of port <3.6> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.7> (U<NI>, E<IISP>, I<ISP>): U
  NNI type of port <3.8> (U<NI>, E<IISP>, I<ISP>): U
```

3 The LMA automatically prompts you to enter ATM addresses for the ports that you have specified as IISP. These are ATM addresses of network devices that you want the IISP port to recognize for routing purposes. They are placed in the routing table of the port. You need to enter these addresses manually because the IISP protocol does not automatically recognize them. You can enter more than one address; press Enter to end the sequence of addresses.

```
*** The following are addresses of ports you have defined as IISP.
    You may enter more than one address per port.
    When you have finished press <Enter>:
  ATM address for port <5.2> (19 bytes-When less: end with '.*'):
  47.00.00.00.00.00.3e.00.00.b0.00.c0.da.69.11.22.00000000c0.da.11.22.00
ATM address was set for port <5.2>
  ATM address for port <5.2> (19 bytes-When less: end with '.*'):
  47.00.00.00.00.00.3e.00.00.b0.00.00.00.00.c0.da.11.22.0033
ATM address was set for port <5.2>
  ATM address for port <5.2> (19 bytes-When less: end with '.*'):
```

4 The LMA automatically prompts you for the NNI type of the ports that you have specified as IISP. Specify the NNI type as User or Network.

```
*** The following is a profile of ports you have defined as Gateway:
  Profile of port <5.2> (U<ser>, N<etwork>): N
```

5 Repeat until you have specified all the IISP ports.

LE Client Configuration Section This section prompts you for the LAN Emulation Client configuration. You give names to the ELANs that you want to be active in the network. In the Virtual Network Configuration section, you will assign Ethernet ports to the ELANs you have named in this section to create vLANs. Until then, the ELANs are considered *potential* ELANs.

You can enter the names of resident ELANs of the switch you are setting up and you can enter names of ELANs from other devices in the network. You can define any number of potential ELANs. To end the sequence, press Enter.

The names of the ELANs resident on a particular switch all have the form elanXXXX_n where "XXXX" is a number unique to the switch and "n" is the sequential number of the ELAN. This is the form you need to use for ELANs that you enter in this section (except for the admin ELAN).

You are first prompted for the name of the admin vLAN. The default name displayed is the name of the admin vLAN of the CoreBuilder 7X00 which is installed in the highest occupied slot in the CoreBuilder chassis. You can change it if you wish.

The name for the admin vLAN which is specified in this section will be automatically chosen for the other modules housed in the same CoreBuilder 7000 family ATM switch chassis, overriding any existing admin vLAN names.

For this section and the Virtual Network Configuration section to operate correctly, at least one CoreBuilder 7X00 interface card must be installed in the CoreBuilder 7000 family ATM switch chassis.

The following shows a typical LE Client Configuration section. Make a list of the ELAN names and the numbers to which they are assigned in this section. You will use it in the Virtual Network Configuration section.

```
  LE Client Configuration
  -=----------------------
*** Hit Enter after VN #2 for end of potential ELAN names list.

  VN #1 ELAN Name: admin
  VN #2 ELAN Name: elan8460_1
  VN #3 ELAN Name: elan67791 _5
  VN #4 ELAN Name: elan1234_5
  VN #5 ELAN Name: elan1234_6
  VN #6 ELAN Name: elan1234_7
  VN #7 ELAN Name: elan6789_0
  VN #8 ELAN Name: elan6789_1
  VN #9 ELAN Name: elan1357_1 0
  VN #10 ELAN Name: elan2468_1
  VN #11 ELAN Name: elan1111_1
  VN #12 ELAN Name: elan2222_2
  VN #13 ELAN Name: elan3333_3
  VN #14 ELAN Name: elan4444_4
  VN #15 ELAN Name: elan5555_5
  VN #16 ELAN Name: elan6666_6
  VN #17 ELAN Name: elan7777_7
  VN #18 ELAN Name:
```

Virtual Network Configuration Section   This section prompts you for the virtual network configuration. In this section, you assign Ethernet ports to the ELANs you entered in the LE Client Configuration section. The Ethernet ports of the CoreBuilder 7X00 interface cards installed in the CoreBuilder 7000 family ATM switch chassis are displayed sequentially. For each port, you enter the number of the ELAN to which you want that port to belong. To end the sequence, press Enter.

At the end of the section, a list of the ELANs that were entered in the LE Client Configuration section but did not have ports assigned to them in this section is displayed.

Table 6-3 lists the short-cut characters you can use to move between sections of the Virtual Network Configuration procedure:

Table 6-3   Virtual Network Configuration Procedure Navigation Aids

Type:	To perform:
}G	Jump to group #G.
*	Update all group items.
+I	Jump to item #I
**	Update all section items.
.T	Assign a VLT tag #T

The following shows a typical virtual network configuration.

```
Virtual Network Configuration
=============================
Fast Ethernet <4.1> belongs to VN # (1-17): 1  < Admin VN >
Fast Ethernet <4.2> belongs to VN # (1-17): 2
Fast Ethernet <4.3> belongs to VN # (1-17): 3
*** Note: A new VN has been created.
Fast Ethernet <4.4> belongs to VN # (1-17): 4
*** Note: A new VN has been created.
Fast Ethernet <4.5> belongs to VN # (1-17): 5
*** Note: A new VN has been created.
Fast Ethernet <4.6> belongs to VN # (1-17): 2
Fast Ethernet <4.7> belongs to VN # (1-17): 17
*** Note: A new VN has been created.
Fast Ethernet <4.8> belongs to VN # (1-17): 3
Fast Ethernet <4.9> belongs to VN # (1-17): 18
*** No such VN No.
Fast Ethernet <4.9> belongs to VN # (1-17): 7
*** Note: A new VN has been created.
Fast Ethernet <4.10> belongs to VN # (1-17): 2 8
*** Note: A new VN has been created.
Fast Ethernet <4.11> belongs to VN # (1-17): 9
*** Note: A new VN has been created.
Fast Ethernet <4.12> belongs to VN # (1-17): 2
Fast Ethernet <4.13> belongs to VN # (1-17): 2
Fast Ethernet <4.14> belongs to VN # (1-17): 2
Fast Ethernet <4.15> belongs to VN # (1-17): 2
Fast Ethernet <4.16> belongs to VN # (1-17): 2
Ethernet port <5.1> belongs to VN # (1-17): 1  < Admin VN >
Ethernet port <5.2> belongs to VN # (1-17): 2
Ethernet port <5.3> belongs to VN # (1-17): 3
Ethernet port <5.4> belongs to VN # (1-17): 4
Ethernet port <5.5> belongs to VN # (1-17): 5
Ethernet port <5.6> belongs to VN # (1-17): 6
*** Note: A new VN has been created.
Ethernet port <5.7> belongs to VN # (1-17): 7
Ethernet port <5.8> belongs to VN # (1-17): 1
Ethernet port <5.9> belongs to VN # (1-17): 1
Ethernet port <5.10> belongs to VN # (1-17): 1
Ethernet port <5.11> belongs to VN # (1-17): 1
Ethernet port <5.12> belongs to VN # (1-17): 1
*** Note: no ports assigned to VN #10 - ELAN : elan2468_1
*** Note: no ports assigned to VN #11 - ELAN : elan1111_1
*** Note: no ports assigned to VN #12 - ELAN : elan2222_2
*** Note: no ports assigned to VN #13 - ELAN : elan3333_3
```

Admin VN Management Configuration Section. In this section you are prompted for the Admin VN Management Configuration parameters: IP address, slot IP address, NMS address, default gateway, and subnet mask. Enter values as appropriate. These parameters support an NMS (Network Management Station) station which is connected to the CoreBuilder 7000 family ATM switch through its Ethernet port. The following example shows a typical Admin VN Management Configuration. Default values are displayed.

```
Admin VN Management Configuration
---------=---------------------
 Switch IP address: 100.0.0.1
 Slot #3 IP address: 100.0.0.100
 NMS address: 255.255.255.0
 Default Gateway: 255.255.255.255
 Subnet Mask: 255.255.255.0
```

Confirmation Section   This section prompts you to save all changed
parameters and then prompts you to reboot the switch.

<table>
<tr>
<td>

Prompt to
save changes

Saving the
switch
configuration

Saving the
edge device
configuration

Prompt for
reboot

</td>
<td>

```
 Accept Changes
 =-------------
*** Note: Change of some parameters will take effect now!!

  Save changes (Y/N)? Y
  Are you sure (Y/N)? y
 Saving NMS parameters...
 Saving LE parameters...
 Saving Network Prefix...
 Saving resident LECS Address...
 Saving active LECS Address...
 Saving NNI parameters...
  The switch new configuration has been saved.

  Now applying the module in slot #4 ...

  Due to new VN configuration, some saved static
  entries in slot #4 have been invalidated.

  The new VN configuration in slot #4 has been applied and saved.

  Now applying the module in slot #5 ...

  The new VN configuration in slot #5 has been applied and saved.

  All the modules new configuration has been applied.
 Reboot the system  (Y/N)? y
 This will reset and reboot the device!
 Are you sure (Y/N)? y
 *** System will reboot in about one minute...
```

</td>
</tr>
</table>

Additional Switch Configuration	The Integrated Fast Setup configures a minimum set of network parameters - enough to get you started.

If you need to make changes or to perform additional configuration tasks, use individual items of the LMA menus. These are all described in the *CoreBuilder 7000 Family ATM Switches User Guide.*

Some additional configuration tasks might be:

Configuring SVCs

CoreBuilder 7000 family ATM switches use standard UNI 3.0 or 3.1 switched virtual channel (SVC). SVC mode can be used when CoreBuilder is in a backbone or workgroup topology, with PVC used whenever necessary. ILMI enables automatic address registration for SVC. Addresses can be registered manually via the LMA menus

Setting the Mode

The CoreBuilder will run UNI 3.0 SVC by default. You can work in UNI 3.1 by choosing this option in the signalling setup menu.

Setting Network Prefix and ATM Addresses

ATM addresses are essential for establishing a connection using SVC. Most devices that support SVC, also support automatic address registration through the ILMI protocol.

A network prefix is essential for address registration to be executed. Refer to *CoreBuilder 7000 Family ATM Switches User Guide* for proper network prefix setting.

For connectivity with devices that do not support ILMI, ATM addresses can be set manually using the Add ATM address function under ATM address setup in the Administration Console menus.

Configuring a PVC

Permanent Virtual Channels (PVC) can be used to connect to devices that do not support switched virtual channels (SVC) standard protocols. In the CoreBuilder 7000 family ATM switch you can create point-to-point (P2P) and point-to-multipoint (P2M) connections. Use the Setup and Configuration Connections menu, to create a PVC call, PTP or PTM. You can also create an out VC in a PTM call, release a PVC call, release an out

VC from call, save PVC connections in flash memory and reset saved connections.

Viewing Network Statistics

At any time after configuring the CoreBuilder 7000 family ATM switch, you can view the available statistics to see how the network is functioning. For example, you may want to display the general statistics for an overview of the network, or the signalling statistics for protocol information on specific ports. Table 6-4 lists the types of statistics available. To view a specific statistic, enter the menu path shown in the table. For more information, see the *CoreBuilder 7000 Family ATM Switch User Guide*.

Table 6-4   Statistics Available

Menu Option	Path	Description
Display General Statistics	(4) STS: Statistics (1) GEN: General switch stats	Displays statistical totals for the switch.
Display Physical Layer Statistics	(4) STS: Statistics (2) PHY: Physical layer	Displays the physical layer statistics for a specified port.
Reset Physical-Layer Statistics	(4) STS: Statistics (8) PHR: Phy layer-reset counters	Resets physical statistics counters.

Display ATM-Layer Port Statistics	(4) STS: Statistics
	  (3) ATM: ATM layer
	    (1) PRT: Stats per port
		Displays the ATM layer statistics for a specified port. Provides information on the capacity of traffic within ports.

Reset ATM-Layer Port Statistics	(4) STS: Statistics
	  (9) ATR: ATM layer-reset counters
	    (1) PRT: Reset counters per port
		Resets the ATM-layer counters for a specified port.

Display ATM-Layer VPI/VCI Statistics	(4) STS: Statistics
	  (3) ATM: ATM layer
	    (2) VPC: Stats per VPI/VCI
		Displays the ATM layer statistics for a VPI/VCI of a specified port.

Reset ATM-Layer VCI/VPI Statistics	(4) STS: Statistics
	  (9) ATR: ATM layer-reset counters
	    (2) VCC: Reset counters per VPI/VCI
		Resets counters for an individual and every VPI/VCI for a specified port.

AAL5 Control Statistics	(4) STS: Statistics
	  (5) CTL: Control frames
	    (1) GET: Get Control frames
		Displays the control frames (AAL5 layer) statistics, including protocol information, for a specified port.

Reset AAL5-Layer Control Statistics	(4) STS: Statistics
	  (5) CTL: Control frames
	    (2) RES: Reset Control frames
		Resets AAL5-layer control statistics for a specified port.

Display Signaling Protocol Statistics	(4) STS: Statistics (6) SIG: Signaling	Displays the signaling protocol statistics for a specified port.
Reset Signaling Statistics	(4) STS: Statistics (10) SIR: Signaling-reset counters	Resets the signaling counters for a specified port.

| **Storing and Retrieving Configuration Parameters** | This section discusses the configuration upload/download facility and includes the following topics: |

- Configuration Upload/Download
- Downloading Selected Data Types
- Organizing Configuration Files
- Activating the Downloaded Configuration
- Uploading the Configuration of a Card
- Downloading the Configuration of a Card
- Loading Software and Configuration Data by Batch Utilities

Configuration Upload/Download

You can store (upload) the configuration of an installed card from its flash memory to an external disk and restore it (download) to the flash memory of the original card — or to the flash memory of a different card of the same type — at a later time. You can perform this operation only through the LMA and not via a SNMP management application like Transcend.

When the switch operates in single-IP Mode, you can use this facility to upload the configuration of any of the installed cards through the LMA of the switch card. When the switch is operating in multiple-IP mode, you can use this facility to upload the configuration of the switch card only.

This feature lets you:

- Backup your switch configuration in case of switch failure
- Transfer the configuration from one switch to another
- Maintain various standard configuration templates which can be loaded according to requirement

The configuration upload works for individual cards installed in the CoreBuilder 7000: either the active switch card or a CoreBuilder 7X00 Interface Card. You select the card whose configuration you want to download or upload from a list of installed cards.

You cannot upload or download configuration parameters to a switch card while it is installed as a redundant switch card. You need to remove the card from the chassis, install it in a different switch chassis as the active switch card and then perform the upload/download operation, as

described below. Afterwards, return the card to its slot in the original chassis.

Downloading Selected Data Types

The CoreBuilder 7000 allows you to upload selected types of configuration data. The types of configuration data you can upload depends on the card you selected. For the switch card, the types of configuration data you can upload are as follows:

■ All Configuration Data

■ Platform Parameters

■ ATM Addresses

■ PNNI Configuration

■ LANE Security

■ PVC Connections

■ LECS Topology

■ LECS Order List

For a CoreBuilder 7X00 card, the data types are as follows:

■ Platform Parameters

■ Static

Organizing Configuration Files

The uploaded configuration files can be named using a naming convention of your choice. Normally, you will want to include information about the data type, the card type and a date or other identifier in the file name. For example, you might use file names like cfg_7000_12jun98 and static_7600_1.

When you download configuration data from the files on the disk to the card, you designate the card by its slot number. The slot can contain the original card from which the data was uploaded, or it can contain another card of the same type.

If you try to download configuration data which was uploaded from one type of card type to another type of card, an appropriate error message is issued.

Activating the Downloaded Configuration

When the configuration files are downloaded into flash memory, they overwrite the previous information. The new parameters are not activated immediately, but rather after the next reboot when they are

read from the flash memory. The CoreBuilder 7000 assumes that the user wants to reboot the switch as soon as possible to activate the new configuration parameters. Therefore, subsequent to a configuration download, all LMA and SNMP set operations are blocked until the next reboot – except for the configuration upload/download and reboot operations.

It is recommended, therefore, to perform a configuration download only when you are ready to reboot and activate the new parameters.

Cards should not be "hot swapped" after a configuration download until after the next reboot.

Uploading the Configuration of a Card

To store (upload) the configuration of a card installed in the CoreBuilder chassis from flash memory to disk, first make sure that the switch is connected to the TFTP server and that it is in single-IP mode and then perform the following steps:

1 Perform the LMA menu command:

```
(1) SYS\ (3) LOA \(6) TCU
```

2 The LMA automatically presents you with a list of the installed cards whose configuration you can upload to disk, for example:

```
Module Types:
    1<Switch module 7000>
    2<Slot 3 - 7600>
    3<Slot 4 - 7600>
    4<Slot 5 - 7400>
    5<Slot 6 - 7200>
Select Module: 1
```

Select the appropriate card from the list—for example, if you want to upload the configuration of the active switch card, select 1 from the menu.

3 The types of configuration data you can upload are displayed as follows.

```
File Types:
    1<All>
    2<Box Profile>
    3<ATM Addresses>
    4<PNNI Configuration>
    5<LANE Security>
    6<PVC Connections>
    7<LECS Topology>
    8<LECS Order List>
```

```
     9<Other>
Select File type:
```

Enter the number of the type of configuration parameters you want to upload. For example, if you want to upload all configuration parameters, select File type 1.

4 Enter the IP address of the TFTP server:

```
Server IP address: 100.0.0.111
```

5 Enter the name of the file to receive the data on disk:

```
Name of file to be uploaded: 7000_cfg
```

Enter a file name without an extension. For the "All" option, the system adds sequential extensions.

6 Confirm the upload.

```
Start upload to 100.0.0.111, file name 7000_cfg, (Y/N)? y
```

The following messages are displayed for each data type:

```
Loading, file name switch/cfg/24_7_cfg.1, file type Box
Profile
Load process of file type Box Profile completed successfully
```

7 Verify the success status of the upload by the LMA menu item:

```
(1) SYS:\ (3) LOA: \(1) STS
```

The upload status is displayed as follows:

```
Load process completed successfully.
```

The status will be "success" only if all the files were successfully loaded. In case of failure to load a file, the "load all" process will be stopped without continuing to the next file, a failure indication is displayed, and the display status option displays the error message:

```
General Error occurred while loading
```

Loading a Single Configuration Data Type

If you want to upload a single data type instead of the entire configuration, proceed as follows from step 3

3 `Select File type: ` **2**

4 `Server IP address: ` **100.0.0.111**

5 `Name of file to be uploaded: ` **switch/cfg/box_prof.cfg**

For loading a single item you can enter a full file name.

6 `Start upload to 100.0.0.111, file name`
`switch/cfg/box_prof.cfg, Box Profile (Y/N)?` **y**

`Load process started...`

Loading the "Other" Data Type

The "Other" item allows you to specify a file type by code number. This option is relevant to configuration data items in the CoreBuilder 7X00 cards and are specified in the Release Notes for those products; the configuration data item and its number (0–9999) are specified there.

If you want to upload the "Other" data type, proceed as follows from step 3

3 `Select File type:` **9**

4 `Insert file type (0-9999):` **1001**

5 `Server IP address:` **100.0.0.111**

6 `Name of file to be uploaded:` **switch/cfg/unknown.cfg**

7 `Start upload to 100.0.0.111, file name`
`switch/cfg/unknown.cfg, 1001 (Y/N)?` **y**

`Load process started...`

Downloading the Configuration of a Card
To retrieve (download) the configuration of a card installed in the CoreBuilder chassis from disk to flash memory, first make sure that the switch is connected to the TFTP server and then perform the following steps:

1 Perform the LMA menu command:
`(1) SYS\ (3) LOA \(7) TCD`

2 The LMA automatically presents you with a list of the installed cards whose configuration you can download from disk, for example:

```
Module Types:
    1<Switch module 7000>
    2<Slot 3 - 7600>
    3<Slot 4 - 7600>
    4<Slot 5 - 7400>
    5<Slot 6 - 7200>
Select Module: 1
```

Select the appropriate card from the list—for example, if you want to download the configuration of the active switch card, select 1 from the menu.

ⓘ *Make sure you select a type of card that matches the configuration data on the files you want to download. In this case, the data on the files must have been uploaded from a switch card. If you choose the wrong type, the data will not be downloaded and you will get an error message.*

3 The types of configuration data you can download are displayed as follows.

```
File Types:
    1<All>
    2<Box Profile>
    3<ATM Addresses>
    4<PNNI Configuration>
    5<LANE Security>
    6<PVC Connections>
    7<LECS Topology>
    8<LECS Order List>
    9<Other>
Select File type:
```

Enter the number of the type of configuration parameters you want to download. For example, if you want to download all configuration parameters, select File type 1.

4 Enter the IP address of the TFTP server:

```
Server IP address: 100.0.0.111
```

5 Enter the name of the file to receive the data on disk:

```
Name of file to be downloaded: 7000_cfg
```

Enter a file name without an extension. For the "All" option, the system adds sequential extensions.

ⓘ *After you confirm the download, all LMA and SNMP set operations are disabled until the download is finished and you reboot the system. The following warning is displayed:*

```
Warning: This action will disable set operations on the
target Device.
```

6 Confirm the download.

```
Start download to 100.0.0.111, file name 7000_cfg, (Y/N)? y
```

The following messages are displayed for each data type:

```
Loading, file name switch/cfg/24_7_cfg.1, file type Box
Profile
```

```
Load process of file type Box Profile completed successfully
```

7 Verify the success status of the download by the LMA menu item:

```
(1) SYS:\ (3) LOA: \(1) STS
```

The download status is displayed as follows:

```
Load process completed successfully.
```

The status will be success only if all the files were successfully loaded. In case of failure to load a file, the "load all" process will be stopped without continuing to the next file, a failure indication is displayed, and the display status option will display the error message:

```
General Error occurred while loading
```

Loading Software and Configuration Data by Batch Utilities

This section describes an alternative to the method of the previous section: RS-232 batch-file utilities you can use to download and upload the executable software and the system configuration parameters for the CoreBuilder 7000 family ATM switch to an external disk via the RS-232 service port. It contains the following topics:

- Batch Upload/Download Utilities
- Batch Downgrade Utilities
- Running a Batch File
- Returning to Operational Mode

This ability allows you to easily restore the configuration to a switch which has failed or to configure a new switch with a standard configuration stored on disk.

The utility is performed by running the appropriate batch file via the RS-232 service port.

Batch Upload/Download Utilities

Table 6-5 shows the utilities and the batch file names.

Table 6-5   Utilities for Upload/Download

Utility	Batch file name
General flash utility	fls_utl.bat
Format all configuration parameters groups in flash memory according to the mapping of version 4.0	cfgfrmat.bat
Upload all configuration parameters groups from the switch engine flash memory to PC file	cfg_upld.bat

Table 6-5 Utilities for Upload/Download

Utility	Batch file name
Download all configuration parameters groups from PC file to the switch engine flash memory	cfg_down.bat
Upload a configuration parameter group from the switch engine flash memory to PC file	grp_upld.bat
Download a configuration parameter group from the PC to the switch engine flash memory	grp_down.bat
Erase a configuration parameter group in the switch engine flash memory	grperase.bat
Set debug flag to ON	dbgon.bat
Set debug flag to OFF	dbgoff.bat
Download all software executable files to the flash memory	down_all.bat
Download all SW executables except atmsw.fls	downpart.bat
Download only atmsw.fls	downmain.bat
Download all software executable files to the flash memory and erase the configuration in flash memory	downoper.bat

Batch Downgrade Utilities

A batch utility is also provided to let you downgrade your system from version 4.0 to the previous version 3.5. The name of the batch file is: V_35back.bat

Running a Batch File

To run a batch file (.bat) on your CoreBuilder 7000 family ATM switch, do the following:

1 Perform the menu item:

```
(1) SYS \(3) LOA \(3) LCL \ 1
```

2 Reboot the CoreBuilder 7000 family ATM switch.

3 Connect your PC to the Service Port of the CoreBuilder 7000 family ATM switch.

4 In the PC, change the directory to the one containing the appropriate files.

5 Run the appropriate batch file from Table 6-5:

   a Type the name of the batch file

   b Type the appropriate ComPort switch (com1/com2)

   c Type the appropriate Speed switch (19200/57600/115200)

d Press Enter

e Choose desired option at a prompt(s) (if at all)

Returning to Operational Mode
After the software has been stored or retrieved, the system will still be in load mode. To return the system to normal operational mode, use one of the following methods.

Method 1 - Shift "O"

1 Reboot the switch

2 Within 3 seconds of rebooting press Shift "O"

3 Perform the menu item
(1) SYS \(3) LOA \ (3) LCL \ **0**

The system is now in operational mode.

Method 2 - dbgoff.bat

1 Run the batch file dbgoff.bat:

a Type dbgoff.bat

b Type the appropriate ComPort switch (com1/com2)

c Type the appropriate Speed switch (19200/57600/115200)

d Press Enter

e Wait for completion

2 Reboot the switch

The system is now in operational mode.

7

REDUNDANCY IN THE COREBUILDER 7000 FAMILY ATM SWITCH

This chapter describes redundancy in the CoreBuilder™ 7000 family ATM switch. The operation of each redundant device is described. For information on installing redundant devices, see Chapter 4.

This chapter includes the following topics:

■ Redundant Power Supply

■ Redundant Switching Module

Redundant Power Supply

This section discusses the following topics:

■ Types of power supplies available

■ Power requirements of the CoreBuilder 7000 family switching and interface cards

■ Using redundant switching cards and redundant power supplies.

Types of Power Supplies

The CoreBuilder 7000 family supports three kinds of power supplies: an AC unit rated at 90A, and two DC units rated at 90A and 40A. You can use each one of them in any CoreBuilder 7000 family ATM switch. The power supply supports two output channels: one 5V DC channel which supplies the CoreBuilder switch and the interfaces cards, and one 12V DC channel which supplies the fans.

The CoreBuilder 7000 family power supplies are shown in Table 7-1.

Table 7-1 CoreBuilder 7000 Family Power Supplies

Power Supply	Current	3Com Number
CoreBuilder 7000/7000HD AC Power Supply	90A	3C37010A
CoreBuilder 7000/7000HD DC Power Supply	90A	3C37027

Power Supply Operation

Load Sharing

The power supplies can operate in load-sharing mode; two 90A power supplies can produce up to 180A. Providing that the power consumption of the unit does not exceed 90 A, load-sharing allows one power supply to serve as a backup.

Overloading

When the installed power supply is rated for less than the required power consumption of the CoreBuilder module, the CoreBuilder will not succeed in powering up. It will attempt to power up, hit the current overload rate and turn the power supply off, going through this cycle repeatedly until the load is reduced.

Calculating the Power Consumption of CoreBuilder Switch

The power consumption of an entire CoreBuilder 7000 family ATM switch unit is calculated by adding up the power consumption of the switching card(s) and interface cards installed in the chassis. Normally, the values for *typical* power consumption can be used in the calculation. Table 7-2 shows the typical power consumption values for the CoreBuilder 7000 family ATM switching cards and interface cards

Table 7-2 Typical Power Consumption of CoreBuilder 7000 Family Cards

Component Description	3Com Number	Typical* Power Consumption (Amp)
CoreBuilder Kit and Switching Card		
CoreBuilder 7000 Kit (one switching card and one power supply)	3C37000	6.3
CoreBuilder 7000 Redundant Switching Card†	3C37016	6.3
CoreBuilder 7000HD Kit (one switching card and one power supply)	3C37001	8.1
CoreBuilder 7000HD Redundant Switching Card	3C37032	8.1
4-port and 8-port ATM Interface Cards		
CoreBuilder 7000 4-port ATM interface card with ■ 4 OC-3c multimode fiber interfaces	3C37052	5.4
CoreBuilder 7000HD 8-port interface card with ■ 4 OC-3 multimode ATM interfaces installed ■ 4 ATM interface receptacles unoccupied	3C37152	6.3
CoreBuilder 7000HD 8-port interface card with ■ 8 OC-3 multimode ATM interfaces installed	3C37158	11.7
CoreBuilder 7000HD 8-port interface card with ■ 4 OC-3 single mode ATM interfaces	3C37153	8.0
CoreBuilder 7000HD 8-port interface card with ■ 8 OC-3 single mode ATM interfaces	3C37159	12.0
CoreBuilder 7000HD 8-port interface card with ■ 8 155 cat 5 UTP ATM interfaces ■ 2 622 ATM interfaces	3C37160	11.0
ATM Physical Modules		
CoreBuilder 7000 622 OC-12 MM Physical Module	3C37080	5.0
CoreBuilder 7000 622 OC-12 SM Physical Module	3C37081	5.0
CoreBuilder 7000 OC-3c SM Physical Module	3C37058	1.4
CoreBuilder 7000 OC-3c MM Physical Module	3C37060	0.9
CoreBuilder 7000 DS-3 Physical Module	3C37061	0.9
CoreBuilder 7000 TP 155M Physical Module	3C37061	0.9
CoreBuilder 720X Ethernet/ATM Interface Card		

Table 7-2 Typical Power Consumption of CoreBuilder 7000 Family Cards

7200 Ethernet/ATM interface card with	3C37262	7.2
■ 12 10Base-T, RJ-45 interfaces		
■ 3 OC-3c multimode ATM interfaces		
7201 Ethernet/ATM interface card with	3C37263	4.5
■ 12 10Base-T, RJ-45 interfaces		
■ 3 ATM interface receptacles unoccupied		
7200F Fiber Ethernet/ATM Interface card with	3C37264	10.8
■ 12 10Base-FL ports, ST con.		
■ 3 OC-3 multimode ATM interfaces		
7201F Fiber Ethernet/ATM Interface card with	3C37266	8.1
■ 12 10Base-FL ports, ST con.		
■ 1 OC-3 multimode ATM interface		
■ 2 ATM interface receptacles unoccupied		
CoreBuilder 74XX Ethernet/ATM Interface Card		
7400 Ethernet/ATM interface card with	3C37400	4.5
■ 24 Ethernet ports (2 RJ-21 connectors)		
■ ATM interface receptacle unoccupied		
7412 Ethernet/ATM Expansion Module with	3C37412	3.6
■ 12 Ethernet ports (1 RJ-21 connector)		
■ ATM interface receptacle unoccupied		
7436 Ethernet/ATM Expansion Module with	3C37436	8.1
■ 36 Ethernet ports (3 RJ-21 connectors)		
■ ATM interface receptacle unoccupied		
CoreBuilder 76XX Fast Ethernet Interface Card		
7600F Fast Ethernet Interface Card with	3C37600	23.4
■ 16FX Fast Ethernet ports		
7608F Fast Ethernet Interface Card with	3C37608	16.2
■ 8FX Fast Ethernet ports		
■ 8 Fast Ethernet ports unoccupied		
7660F Fast Ethernet Interface Card with	3C37660	1.8
■ 2FX Fast Ethernet ports		
■ 14 Fast Ethernet ports unoccupied		
7600T Fast Ethernet Interface Card	3C37601	20.7
■ 16TX Fast Ethernet ports		

Table 7-2   Typical Power Consumption of CoreBuilder 7000 Family Cards

7608T Fast Ethernet interface card	3C37617	15.3
■ 8TX Fast Ethernet ports		
■ 8 Fast Ethernet ports unoccupied		
7662T Fast Ethernet module	3C37662	1.4
■ 2TX Fast Ethernet ports		
■ 14 Fast Ethernet ports unoccupied		

* The typical power consumption values represent typical traffic, load and line speed of the CoreBuilder and interface cards. Maximum power consumption of the cards is 10% higher than the typical values, and occurs when all card ports are working at full rate
† A redundant switch has the same power requirements as the active switch

Required Power Supply for Various CoreBuilder Installations

Table 7-3, which is calculated from Table 7-2, shows the number of power supplies required (Single or Dual) for various CoreBuilder 7000 installations. The first column describes the particular combination of cards installed and covers the most common applications. The second column shows the number of power supplies required if a redundant switch is not installed; the third column shows the number of power supplies required if a redundant switch is installed.

Table 7-3   Required Power Supply for Various Installations

Cards Installed in CoreBuilder Chassis	No Redundant Switch Installed	Redundant Switch Installed
Data Center - High-density Fast Ethernet and ATM		
■ CB7000 HD Switching Card ■ 4 X CB7600F Fast Ethernet Interface Card	Dual 90A	Dual 90A
■ CB7000 HD Switching Card ■ 4 X CB7600T Fast Ethernet Interface Card	Single 90A	Dual 90A
■ CB7000 HD Switching Card ■ 3 X 7600F Fast Ethernet Interface Card ■ 1 X 8-port ATM Interface Card	Single 90A	Dual 90A
■ CB7000 HD Switching Card ■ 3 X 7600T Fast Ethernet Interface Card ■ 1 X 8-port ATM Interface Card	Single 90A	Single 90A
Data Closet - Ethernet		
■ CB7000 Switching Card ■ 4 X 7436 ATM Interface Card	Single 90A	Single 90A

Table 7-3 Required Power Supply for Various Installations (continued)

■ CB7000 Switching Card		Single 90A	Single 90A
■ 3 X 7436 ATM Interface Cards			
ATM Data Center with high-density Fast Ethernet			
■ CB7000HD Switching Card		Single 90A	Single 90A
■ 1 X 7600F ATM Interface Card			
■ 3*8 port ATM Interface Cards			
■ CB7000HD Switching Card		Single 90A	Single 90A
■ 1 X 7600T ATM Interface Card			
■ 3*8 port ATM Interface Cards			
Other applications			
■ CB7000 Switch Card		Single 90A	Single 90A
■ 4 X 7262 Ethernet/ATM Interface Card			

Providing Redundancy for Various Power Loads

This section describes when redundant switch cards and redundant power supplies can be used in a CoreBuilder switch.

In order to determine whether a redundant switch card and/or an redundant power supply can be used in a CoreBuilder switch, the total power consumption of all installed cards must be examined. According to the total power consumption, there are three possibilities, as the following examples illustrate:

Installation I: The total power consumption of a single switching card (that is, no redundant card installed) and all interface cards exceeds 90A. In this case, a Dual 90A supply is required so that the second power supply cannot be redundant. A redundant switch card can be installed. This "heavy load" installation is illustrated by the first example installation in Table 7-3.

Installation II: The total power consumption of <u>two</u> switching cards (i.e., redundant card installed) and all interface cards exceeds 90A but without the second switching card the consumption is less than 90A. In this case, either a redundant switch card or a redundant power supply can be installed, but not both. This "medium load" installation is illustrated by the second example installation in Table 7-3.

Installation III: The total power consumption of two switching cards and all interface cards does not exceed 90A. In this case, both a redundant switch card and a redundant power supply can be installed.

The light load installation is illustrated by the fourth example installation in Table 7-3.

i *In all installations that do not include multiple CB7600 cards both redundant switch cards and redundant power supplies can be installed.*

Power Supply Specifications

90A AC Power Supply

Table 7-4 CoreBuilder 7000 (3C37010A) Enhanced Power Supply Specifications

Parameter	Channel 1	Channel 2
Nominal output voltage (V)	5	12
Output voltage range (V)	5 +/- 5%	12 +/- 3%
Maximum output current (A)	90	2
Minimum output current (A)	0	0
Maximum output power (W)	450	24
Input voltage range (V)	85 – 265	
Input current range (A)	6.8A@100VAC 3.4A@200VAC	
Inrush current (A)	25A@100VAC 50A@200VAC	
Frequency (Hz)	47 ~ 63	
Operating temperature (Celsius)	-10 ~ 40	
Safety	UL1950, EN60950	
Efficiency (%)	75	
Max power input (W)	632	
P.S Heat Dissipation (W)	158	
Heat Dissipation (BTU)	2156	

90A DC Power Supply

Table 7-5 CoreBuilder DC (3C37027) Power Supply Specifications

Parameter	Channel 1	Channel 2
Nominal output voltage (V)	5	12.3
Output voltage range (V)	5 +/- 5%	12.3 +/- 3%
Maximum output current (A)	90	2
Minimum output current (A)	0	0
Maximum output power (W)	450	24

Table 7-5   CoreBuilder DC (3C37027) Power Supply Specifications

Input voltage range (V)	36-72
Input current range (A)	13.0A@48VDC
Inrush current (A)	35A@48VDC
Operating temperature (Celsius)	0 ~ 40
Safety	UL478, 1950/CSA22.2/TUV EN60950
Efficiency (%)	76
Max power input (W)	625
P.S Heat Dissipation (W)	150
Heat Dissipation (BTU)	2123

Redundant Switching Module

This section covers the following topics:

- Need for a Redundant Switching Module
- Identifying the Active Switching Module
- Conditions for Switch-over to Redundant module
- Switching Module Configuration Database
- Info Based on the MAC Address
- Resetting to Factory Defaults

Need for a Redundant Switching Module

A *redundant* switching module is a backup switching card that is capable of performing all the tasks of the currently active switching module should it fail. For this purpose, the redundant module's data base is kept up-to-date with network parameters that are configured in the active switching module.

The redundant switching module is a necessary requirement in a critical-mission network. When a switch module fails in such a network, loss of data and interruption in transmission must be kept to an absolute minimum.

Identifying the Active Switching Module

As the CoreBuilder 7000 boots, the first of the two switch modules to begin operating becomes the active switch module.

Once the unit has booted, the active switch module can be identified by the LMA command (1) SYS (4) SWM: or by the ACT LED as follows:

- Active Switch: ACT LED flashes rapidly
- Redundant Switch: ACT LED flashes once every 2 secs.

The redundancy feature works for any combination of the CoreBuilder 7000 and CoreBuilder 7000HD switch modules installed in the chassis.

Conditions for Switch-over to Redundant module

The switch-over to the redundant module will occur in the following situations:

- Removal of the main switching module from the chassis.
- Malfunction of the main switching module.
- Manual reboot of the CoreBuilder 7000 by LMA, Telnet (soft reboot) or Transcend NMS.

During the switch-over, the redundant switch reboots itself and comes up as the active one. A temporary dropping of all connections will occur during the switch-over. The connections are re-established after the switch-over process is complete.

Switching Module Configuration Database

Each switching module contains a configuration data base where the switch configuration data is stored. In order that the redundant switching module be ready to assume the role of the active switch, its configuration database is updated from the active switch. This occurs in the following situations:

■ When the switch is booted.

■ When the switch configuration is changed.

Not all of the configuration data is transferred from the active to the redundant switch. The data that was not transferred must be updated manually. The following table presents data which is transferred and data which must be updated manually (see "Setting up Switch Module Hardware Redundancy" on page 4-7).

Table 7-6   Updating Configuration Database

Data Transferred from Active to Redundant Switch	Data to be Updated Manually in Redundant Switch
CoreBuilder 7000 IP address	LECS topology database (include: LES list and addresses, ELAN names, connection type)
NMS IP address	Static ATM addresses
Default gateway IP address	PVC configurations, UNI version, UNI profile, signaling.
LECS state	
LECS order list database (SW Ver. 3.50 and up)	
LES state	
CoreBuilder 7000 network prefix	
Network prefix significant length	
CoreBuilder 7000 active LECS address	
Built-in LES ATM addresses	
Built-in LES names elanXXXX_Y (ELAN name)	
NNI/UNI port setup	

Table 7-6   Updating Configuration Database (continued)

Data Transferred from Active to Redundant Switch	Data to be Updated Manually in Redundant Switch
NNI maximum number of hops for all ports	

Info Based on the MAC Address

Each switching module board has a unique MAC address burned into its EPROM. This MAC address is used by the CoreBuilder 7000 for three purposes:

- For the IP stack
- For the LES ATM address user part
- For calculating a unique number to be assigned to the ELAN name.

The ELAN names have the format ELANxxxx_y where xxxx is a unique number calculated using the MAC address and y is an integer from 0 to 15 automatically assigned to each of the 16 default LESs of the CoreBuilder 7000. In this way, each LES has a unique ELAN name and unique ATM address.

When a redundant switching card takes over after the primary switching card fails, the IP address, the ELAN names and LES address remain the same as they were in the primary switch.

Publishing the New MAC Address

A redundant switch that has become active sends a reverse ARP (RARP) to publish its MAC address to the network devices.

For devices that do not learn MAC addresses from a RARP, you will need to reset the IP address entry of the CoreBuilder 7000 in their device table.

Resetting to Factory Defaults

The ELAN names and LES addresses (user part) will be changed only if the user performs a reset to factory defaults by LMA (or TELNET).

After resetting to factory defaults, the MAC address burned in the active switch EPROM will supersede the one stored in the FLASH memory resulting in new ELAN names and LES addresses.

Resetting to factory default will cause all connections to be dropped until the new ELAN names are updated in the LECs.

8

TROUBLESHOOTING

This chapter explains how to troubleshoot specific problems you may encounter during power-on and system operation. It also shows how to perform related diagnostic tasks, such as replacing fuses or cleaning fiber optic cables.

If you experience problems that are not addressed in this chapter, contact 3Com Technical Support. See Appendix D.

Solving Common Problems

The following problems may arise while working with the CoreBuilder™ 7000 family ATM switch. If your problem does not appear on this list, view relevant statistics and parameters using the Administration Console menus (refer to *CoreBuilder 7000 family ATM switches User Guide*). You can also contact 3Com Technical Support. Also, be sure to read through the release notes.

Table 8-1   Recommended Action for Common Problems

Problem	Recommended Action
Terminal does not show anything	If the control terminal is physically connected to the CoreBuilder 7000 family ATM switch, but does not load the Administration Console Menus, verify that your terminal setup matches the specifications (see "Connecting the Control Terminal" on page 4-19). Also, make sure your cable is configured as DCE (see "Ethernet Cabling" on page E-11).
Port cables do not work	If the cables attached to the CoreBuilder 7000 family ATM switch interface ports do not work, check that the connectors are firmly snapped in place. Also, make sure that each wire connects to Rx on one end and Tx on the other.
ACT LED not blinking	When the CoreBuilder 7000 family ATM switch is activated, the switch module and interface cards ACT LEDs should be blinking. If not, verify that the switch module and interface cards are properly inserted. Make sure that the control terminal is connected to the control port correctly, as an incorrect connection of this cable sometimes results in the inability of the system to function properly.

Table 8-1 Recommended Action for Common Problems (continued)

Problem	Recommended Action
Interface Card fails	If one of the interface cards fails, use the Initialize Interface (INI) option in the System (SYS) menu, Interface (IFC) option to reinitialize the interface. If this fails, you can try to restart the whole unit again. If neither of these actions correct the problem you should contact a 3Com service person.
	When handling modules, always use a wrist strap that is connected to a proper ground. This prevents the module from being damaged by electrostatic discharge.
Fans do not rotate	If the fans do not work when the unit is powered up, the fan tray may not be inserted properly. Unplug the power cord and reinsert the fan tray properly against the enclosure.

Power Supply Troubleshooting

This section discusses common problems related to the CoreBuilder 7000 family ATM switch power supply.

Table 8-2 Problems Related to the Power Supply

Problem	Possible Cause	Recommended Action
CoreBuilder 7000 family ATM switch not receiving power	■ The CoreBuilder 7000 family ATM switch is not connected to/receiving external power.	**1** Check that the power cord is firmly plugged into both the system and the building's power outlet.
		2 Check that the power cable meets the requirements described in the *Safety Rules* section of Chapter 3.
	■ The power supply malfunctioned.	**3** Restart the system by replugging the power cord.
	■ A fuse is blown.	**4** If the problem persists, consider replacing the power cable, replacing the power supply and checking the power supply fuse; the fuse resides within the power supply. You have to extract the power supply in order to check and replace a fuse.
		5 If the system is still not operating, contact 3Com Technical Support or your service person.
Circuit breaker has tripped	■ External wiring problem	**1** Unplug the power cord of the system.
	■ Power supply failure	**2** Verify that the system is properly connected to AC power with the correct voltage. See Appendix A: CoreBuilder 7000 Family ATM Switch Specifications.
		3 If the power connection is the problem, replace the cable. If the problem remains, contact 3Com Technical Support.

Related Diagnostic Procedures

When troubleshooting problems, you may have to perform minor procedures to help correct the problem. These procedures are described below. For more complex operations on the CoreBuilder 7000 family ATM switch, contact 3Com Technical Support.

Table 8-3   Diagnostic Procedures

Procedure	Action
Checking fan operations	In case of system overheating, check that the power supply fan and the fans in the fan tray are operating. To check for fan movement in the CoreBuilder 7000 family ATM switch's fan tray, pull a few modules from the chassis to view the fans on the left side of the system.
Cleaning dirty fiber optic cables*	Fiber optic transceivers are sensitive optical devices that need to be handled carefully. If dirt collects on the fiber optic lens, you may notice that the LED for an ATM port link status does not light. You may also notice degraded performance of that port, indicated by an increase in the physical layer statistics count for that port.
	To prevent dust from collecting on the fiber optic lens, keep the dust covers on the ports at all times when they are not in use. To clean a fiber optic lens, follow the procedure below:
	1 Remove any accumulated dust or debris from the port or connector by blowing off all surfaces with a canned air duster.
	2 Compressed gas is recommended, such as Chemtronics' Ultrajet ® or the Triangle Tool Group's Liqui-Too!™ Dust-A-Way. Do not use commercial compressed air or "house air" because of the risk of oil contamination.
	3 Reconnect the cable to the port to see if the dusting corrected the problem.
	4 If the LED still does not appear, or if it lights yellow, continue with steps 5 and 6.
	5 Gently wipe the ports with a lint-free, non-abrasive, non-adhesive swab. Microswabs™ by Texwipe™ are recommended.
	6 Gently wipe the connectors with a lint-free, non-abrasive wipe or pad. Texwipe™ pads are recommended.

* See safety precautions in next section.

Safety Precautions for Fiber Optics Connectors

⚠ *Avoid touching all surfaces after cleaning the connectors, and keep all unused ports covered.*

⚠ *Vermeiden Sie das Berühren aller Oberflächen nach dem Säubern der Kontakte und verdecken Sie alle nicht benutzten Öffnungen.*

⚠ *Ne toucher aucune surface après le nettoyage des connecteurs et garder les pièces inutilisées couvertes.*

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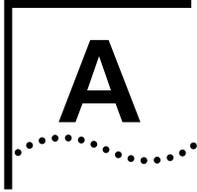
CoreBuilder™ 7000 Family ATM Switch Specifications

Physical Dimensions	■ Height: 38.8 cm (15.3 in)
	■ Width: 3.81 cm (1.5 in)
	■ Depth: 32.7 cm (12.8 in)
	■ Weight: 1.7 kg (3.74 lb)
Environmental Requirements	
Operating Temperature	■ 0° to 40° C (32° to 104° F)
Operating Humidity	■ 10 to 90% relative humidity, non-condensing
Storage Temperature	■ -20° to 75° C (-4° to 167° F)
Storage Humidity	■ 95% maximum relative humidity, non-condensing
Thermal Rating	■ 505 watts maximum
	■ 1724 BTU/hour maximum
Safety	
Agency Certifications	■ UL 1950, CSA 22.2 No. 1950, EN 60950, IEC 825-1 825-2, PCB UL 94V-0, PCB ANSI/IPC-RB-276 class 2
Designed to Comply with	■ VDE 0871 part 2 class A, EN 55022
AC Protection	■ 20 amp circuit breaker
Electromagnetic Compatibility	■ Meets FCC part 15, Subparagraph B, Class A limits.
	■ Directive complied with: EMC 89/336/EEC as amended by 92/31/EEC and 93/68/EEC. Emission: EN50081-1 (EN55022) Immunity: EM50082-1 (IEC801-2,-3,-4)

Power Supply

AC Line Frequency
- 47 to 63 Hz

Input Voltage Options
- 110/220 Volt Auto selectable

Current Rating
- 5/2.8 amps typical

Redundancy (optional)
- dual power supplies

Standards supported

SNMP
- MIB II (RFC 1213)
- AToM MIB (RFC 1695)
- AToM 2 (Circuit Statistics)
- SONET MIB
- Private chassis MIB

ATM
- Signalling - UNI 3.0/3.1/4.0
- ILMI - UNI 3.0/3.1/4.0
- PNNI - IISP
- LE 1.0

CoreBuilder Management and Interface LEDs

Switch Module
- PWR - Power indication (Green)
- FAIL - Module fail indication (Red)
- ACT - Activity, module active and running (Yellow)
- 10BASE-T status - Ethernet port status (Green)
- Service port status - RS-232 (Green)
- Control port status - RS-232 (Green)

Interface Card
- PWR
- FAIL
- ACT
- LINK STATUS - per port physical layer status (Green)
- FAIL - per port interface status (Red)
- ACT - per port traffic activity (Yellow)

CoreBuilder Management and Interface Connectors	**Management**
	■ Management - RJ-45 - Standard Ethernet connector
	■ Service - RS-232 - 9 pin D-type-standard DCE.
	■ Control - RS-232 - 9 pin D-type standard DCE.
	Interfaces
	■ ATM port OC-3-SC connector Multimode fiber
	■ ATM port OC-3-SC connector Singlemode fiber (category 1 - short reach)
	■ ATM port DS-3-BNC connector coax 75 Ohm cable

B
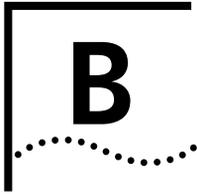
SAFETY INFORMATION

This appendix contains safety information about the CoreBuilder™ 7000 family ATM switch, including:

- Guidelines for avoiding bodily harm.
- Guidelines for avoiding equipment damage.

Bodily Harm

To avoid bodily harm as well as possible damage to your CoreBuilder 7000 Family ATM Switch, follow these precautions.

- Do not lift the system without the assistance of another person. A fully-configured CoreBuilder 7000 Family ATM Switch weighs 43 pounds (19.5 kg) as shipped.

- Do not insert any metal objects, such as a screwdriver or a finger with jewelry, into an open slot when the system is powered on, for example, when you are installing or replacing a module. This could cause burns or other bodily harm, as well as system damage.

- CLASS 1 LED PRODUCT

  3Com recommends that you do not look into the LED while it is powered on, either by the naked eye or through any magnifying device.

  Class 1 LED products include:

  - ATM Multimode Interface (OC-3, OC12)
  - 8-Port Board ATM Interface Module
  - 4-Port Board ATM Interface Module
  - CoreBuilder 7200F Interface Module
  - CoreBuilder 7600 (Fx interface) Interface Module

- CLASS 1 LASER PRODUCT

3Com recommends that you do not look into the laser while it is powered on, either by the naked eye or through any magnifying device.

Class 1 laser products include

- ATM Single Mode Interface (OC-3, OC12)
- 8-Port Board ATM Interface Module
- 4-Port Board ATM Interface Module
- CoreBuilder 7800 Interface Module

Körperliche Schäden

Um Schaden am Körper wie auch möglicherweise Schäden an Ihrem CoreBuilder 7000 ATM Schalter zu vermeiden, folgen Sie diesen Vorsichtsregeln:

- Heben Sie das System nicht ohne Hilfe einer anderen Person hoch. Ein voll ausgerüsteter CoreBuilder 7000 ATM Schalter wiegt bei Versand 43 Pfund (19.5 kgs).
- Steht das System unter Strom, wenn sie ein Modul installieren oder auswechseln, führen Sie keine Metallgegenstände, wie einen Schraubenzieher oder einen Finger mit Schmuck in den offenen Schlitz ein. Das könnte zu Verbrennungen oder anderen Körperschäden führen, sowie auch zu Schäden am System.

Dommages corporels

Afin d'éviter des blessures ainsi qu'un dommage possible au commutateur CoreBuilder 7000 ATM, prendre les précautions suivantes.

- Ne pas soulever le système sans l'assistance d'une autre personne. Un commutateur complètement monté CoreBuilder 7000 Family ATM Switch pèse environ 43 livres (19,5kg) lorsqu'il est livré. .
- Si le système est alimenté lors de l'installation ou du remplacement d'un module, ne jamais insérer d'objet métallique tel qu'un tourne-vis ou un doigt portant un bijou dans la fente. Cela est susceptible de provoquer brûlures ou autres dommages corporels, et d'endommager le système.

Equipment Damage

To avoid damaging your CoreBuilder 7000 Family ATM Switch, follow these precautions:

- When handling replacement parts, 3Com recommends that you always use a wrist strap connected to a proper ground. This helps prevent the part from being damaged by electrostatic discharge. Additionally, when not in use, the module should be stored in an antistatic bag.

- Cover every empty slot with a faceplate to protect the system from dust or other foreign substances, and to ensure proper system cooling.

Schäden Am Gerät

Um Schäden an ihrem CoreBuilder 7000 Family ATM Schalter zu vermeiden, folgen Sie diesen Vorsichtsmaßnahmen:

- Wenn Sie Ersatzteile handhaben, benutzen Sie immer ein Band am Handgelenk, daß gut geerdet ist. Das hilft vermeiden, daß das Ersatzteil durch elektrostatische Entladung beschädigt wird. Darüber hinaus sollte ein Modul, wenn nicht benutzt, in einem antistatischen Beutel aufbewahrt werden.

- Verdecken Sie jeden leeren Schlitz mit einer Abdeckplatte, um das System vor Staub oder anderen Fremdkörpern zu schützen und richtiges Abkühlen des Systems zu erreichen.

Dommage causé à l'équipement

Afin d'éviter d'endommager le commutateur CoreBuilder 7000 Family ATM Switch, prendre les précautions suivantes:

- Lors de la manipulation des pièces de rechange, 3Com recommande de toujours utiliser une bande attachée au poignet et reliée à la terre. Cela aidera à éviter que la pièce ne soit endommagée par une décharge électrostatique. De plus, lorsqu'il n'est pas utilisé, le module doit être conservé dans un emballage antistatique.

- Couvrir toute fente vide afin de protéger le système de la poussière ou d'autres corps étrangers et d'assurer un refroissement correct du système.
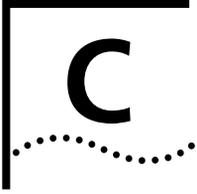
C
SITE REQUIREMENTS

This chapter addresses the various requirements to be met when preparing the CoreBuilder™ 7000 family ATM switch site. This includes the following elements:

■ Performing all necessary planning, ordering, installing, and maintenance.

■ When required, contacting the appropriate facilities manager for assistance.

■ Ensuring that all building and electrical code requirements (national, state, and local) are met.

Environmental and Safety Requirements

This section includes environmental and safety requirements are applicable to the installation of the CoreBuilder 7000 family ATM switch.

Protective Grounding

For your safety and to ensure optimum performance of the system, verify that all protective grounding requirements have been met in accordance with the applicable national, state, and local electrical codes.

You must also verify that you have properly grounded the distribution rack. This is normally done with a distribution rack grounding kit and a ground conductor that is carried back to earth or to another suitable building ground. Proper distribution rack grounding will ensure that voltages induced into wiring by lightning or other disturbances are directed to ground.

Environmental Specifications

For the system to operate properly, the following environmental conditions should exist:

■ Ambient air temperature: 0° to 40° C (32° to 104° F).

■ Operating humidity: 10 to 95% relative humidity (non-condensing).

■ Power requirements: 115-Volts AC power, 15-Amp service receptacles, type N5/15 or NEMA 5-15R (for U.S.) or 220 Volts AC for Europe.

Thermal Recommendations

This sections contains recommendations for handling the heat generated by the CoreBuilder 7000 family ATM switch. It is essential that you provide a suitable environment for both performance and safety.

General Recommendations

The following are some general thermal recommendations for the wiring closet:

■ Ensure that the ventilation in the wiring closet is adequate to maintain a temperature below 40° C (104° F).

■ During non-business hours, make sure that the ventilation is not shut down while a CoreBuilder 7000 family ATM switch remains powered up; otherwise, the equipment may overheat.

Power and Heat Specifications

The following are power and heat specifications for the CoreBuilder 7000 family ATM switch:

■ Maximum power consumption: 250 Watts

■ Maximum heat generated: 1724 BTU per hour

■ Operating temperature: 0° to 40° C (32° to 104° F)

Wiring Closet Considerations

The cabling system used at the facility should cover the majority of wiring closet concerns. You may want to consider the following recommendations.

■ Verify that the facility meets all requirements mentioned in the system cabling plan.

■ Ensure that the system is easily accessible for installation and service.

■ Use AC power, 15-Amp service receptacles, type N5/15 or NEMA 5-15R for 120Vac.

■ Select a vinyl floor covering for the wiring closet. (Concrete floors tend to accumulate dust, and carpets often cause static electricity.)

■ Ensure that the wiring closet floor is flat and level. If the floor is not level, ensure that the racks are bolted to the floor to prevent them from tipping over.

■ Ensure that all wiring closets have doors with locks to prevent unauthorized access.

■ Provide adequate overhead lighting in the wiring closet for easy maintenance.

■ Ensure that each wiring closet has a suitable ground. All metal racks, enclosures, boxes, and raceways in the closet should be grounded.

■ Assign wiring closet identification numbers using architectural location codes or some type of floor grid matrix.

■ Ensure that all system environmental requirements are met (such as ambient temperature and humidity).

Distribution Rack Requirements

This section describes the basic mechanical and space requirements for the distribution rack (refer to Figure C-1).
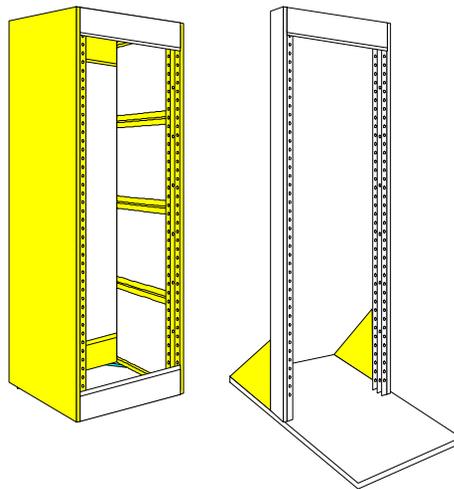
Figure C-1 Distribution racks

Mechanical Requirements

Racks should comply with the standards and requirements mentioned in the cabling system plan and should conform to conventional standards. In the United States, use EIA Standard RS-310C: Racks, Panels, and Associated Equipment. In countries other than the United States, use IEC Standard 297: Dimensions of Panels and Racks.

The following are distribution rack requirements:

- Use an open style, 19-inch rack. The rack styles shown in Figure C-1 facilitate easy maintenance and provide excellent ventilation.

- The rack should use the universal mounting rail hole pattern identified in IEC Standard 297.

- The rack should be made of steel.

- The rack should support approximately 272 kilograms (600 pounds).

- The rack should have adequate electrical grounding. A distribution rack grounding kit may be used.

- The rack should be attached to the wiring closet floor with 9.5 millimeters (3/8 inch) lag screws or equivalent hardware. The floor under the rack should be level within 5 millimeters (3/16 inch). Use a floor leveling cement compound if necessary or bolt the racks to the floor.

- Brace open racks if the channel thickness is less than 6.4 millimeters (1/4 inch).

- Install equipment in the lower half of the equipment rack to avoid making the rack top too heavy.

D
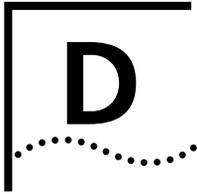
TECHNICAL SUPPORT

3Com provides easy access to technical support information through a variety of services. This appendix describes these services.

Information contained in this appendix is correct at time of publication. For the very latest, 3Com recommends that you access the 3Com Corporation World Wide Web site.

Online Technical Services

3Com offers worldwide product support 24 hours a day, 7 days a week, through the following online systems:

- World Wide Web site
- 3Com FTP site
- 3Com Bulletin Board Service (3Com BBS)
- 3ComFacts^{SM} automated fax service

World Wide Web Site

Access the latest networking information on the 3Com Corporation World Wide Web site by entering the URL into your Internet browser:

http://www.3com.com/

This service provides access to online support information such as technical documentation and software library, as well as support options ranging from technical education to maintenance and professional services.

3Com FTP Site Download drivers, patches, and software across the Internet from the 3Com public FTP site. This service is available 24 hours a day, 7 days a week.

To connect to the 3Com FTP site, enter the following information into your FTP client:

- Hostname: `ftp.3com.com` (or `192.156.136.12`)
- Username: `anonymous`
- Password: `<your Internet e-mail address>`

A user name and password are not needed with Web browser software such as Netscape Navigator and Internet Explorer.

3Com Bulletin Board Service The 3Com BBS contains patches, software, and drivers for 3Com products. This service is available through analog modem or digital modem (ISDN) 24 hours a day, 7 days a week.

Access by Analog Modem

To reach the service by modem, set your modem to 8 data bits, no parity, and 1 stop bit. Call the telephone number nearest you:

Country	Data Rate	Telephone Number
Australia	Up to 14,400 bps	61 2 9955 2073
Brazil	Up to 14,400 bps	55 11 5181 9666
France	Up to 14,400 bps	33 1 6986 6954
Germany	Up to 28,800 bps	4989 62732 188
Hong Kong	Up to 14,400 bps	852 2537 5601
Italy	Up to 14,400 bps	39 2 27300680
Japan	Up to 14,400 bps	81 3 3345 7266
Mexico	Up to 28,800 bps	52 5 520 7835
P.R. of China	Up to 14,400 bps	86 10 684 92351
Taiwan, R.O.C.	Up to 14,400 bps	886 2 377 5840
U.K.	Up to 28,800 bps	44 1442 438278
U.S.A.	Up to 28,800 bps	1 408 980 8204

Access by Digital Modem

ISDN users can dial in to the 3Com BBS using a digital modem for fast access up to 56 Kbps. To access the 3Com BBS using ISDN, use the following number:

1 408 654 2703

3ComFacts Automated Fax Service

The 3ComFacts automated fax service provides technical articles, diagrams, and troubleshooting instructions on 3Com products 24 hours a day, 7 days a week.

Call 3ComFacts using your Touch-Tone telephone:

1 408 727 7021

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- Product model name, part number, and serial number
- A list of system hardware and software, including revision levels
- Diagnostic error messages
- Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to obtain assistance from the 3Com online technical resources or from your network supplier, 3Com offers technical telephone support services. To find out more about your support options, please call the 3Com technical telephone support phone number at the location nearest you.

When you contact 3Com for assistance, have the following information ready:

■ Product model name, part number, and serial number

■ A list of system hardware and software, including revision levels

■ Diagnostic error messages

■ Details about recent configuration changes, if applicable

Below is a list of worldwide technical telephone support numbers:

Country	Telephone Number	Country	Telephone Number
Asia Pacific Rim			
Australia	1 800 678 515	New Zealand	0800 446 398
China		Singapore	800 6161 463
From anywhere in China:	86 21 6350 1590	S. Korea	
From Shanghai:	10 800 3656	From anywhere in S. Korea:	82 2 3455 6455
Hong Kong	800 933 486	From Seoul:	00798 611 2230
India	61 2 9937 5085	Taiwan	0080 611 261
Indonesia	001 800 61 009	Thailand	001 800 611 2000
Japan	0031 61 6439	Pakistan	61 2 9937 5085
Malaysia	1800 801 777	Philippines	1235 61 266 2602
Europe			
From anywhere in Europe, call:	+31 (0)30 6029900 phone +31 (0)30 6029999 fax		

From the following European countries, you may use the toll-free numbers:

Country	Telephone Number	Country	Telephone Number
Austria	06 607468	Netherlands	0800 0227788
Belgium	0800 71429	Norway	800 11376
Denmark	800 17309	Poland	0800 3111206
Finland	0800 113153	Portugal	05 05313416
France	0800 917959	South Africa	0800 995014
Germany	0130 821502	Spain	900 983125
Hungary	00800 12813	Sweden	020 795482
Ireland	1 800 553117	Switzerland	0800 55 3072
Israel	177 3103794	U.K.	0800 966197
Italy	1678 79489		
Latin America			
Argentina	541 312 3266	Colombia	571 629 4847
Brazil	55 11 523 2725, ext. 422	Mexico	01 800 849 2273
North America	1 800 NET 3Com (1 800 638 3266)		

Returning Products for Repair

Before you send a product directly to 3Com for repair, you must first obtain a Return Materials Authorization (RMA) number. Products sent to 3Com without RMA numbers will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number, call or fax:

Country	Telephone Number	Fax Number
Asia, Pacific Rim	65 543 6342	65 543 6348
Europe, South Africa, and Middle East	011 44 1442 435860	011 44 1442 435718

From the following European countries, you may call the toll-free numbers; select option 2 and then option 2:

Belgium	0800 71429
Denmark	800 17309
Finland	0800 113153
France	0800 917959
Germany	0130 821502
Hungary	00800 12813
Ireland	1800553117
Israel	177 3103794
Italy	1678 79489
Netherlands	0800 0227788
Norway	800 11376
Spain	900 983125
Sweden	020 795482
U.K.	0800 966197
Austria	06 607468
Poland	00800 3111206
Portugal	05 05313416
South Africa	0800 995014
Switzerland	0800 55 3072

Country	Telephone Number	Fax Number
Latin America	1 408 326 2927	1 408 764 6883
U.S.A. and Canada	1 800 876 3266, option 2	1 408 764 7120

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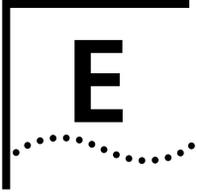
CABLING REQUIREMENTS

This chapter addresses many aspects of installing optical fiber cabling to support the CoreBuilder 7000 family ATM switch environment. It will also deal with modem cables and Ethernet and control cables for management. The following topics are covered:

- Installing new cabling
- ATM cabling requirements
- Ethernet cabling requirements

Installing New Cabling

If you are installing new cabling, follow these guidelines:

- 3Com recommends that you use a cabling system plan, such as AT&T's Premises Distribution System (PDS) or the IBM Cabling System.
- Determine how many CoreBuilder 7000 units are going to be supported by each wiring closet, and how many downlink connections from these CoreBuilder 7000 units are planned.
- Locate wiring closets to enable connections to the different floors.
- To simplify installation of the network and to aid in troubleshooting, install a telephone in each wiring closet for communication between wiring closets, work areas, and other locations.
- Include all linear distances (vertical rises, etc.) in the cable plan so that all cables - from wiring closet to desk and to other wiring closets - are under their respective maximum lengths.

Cable Labeling and Record Keeping

A reliable cable labelling and record keeping system is essential when planning any network installation. A good cable labelling system provides enough information for you to locate the opposite end of any cable. Maintaining accurate records helps you to: 1) relocate devices easily, 2) make changes quickly, and 3) isolate faults in the distribution system.

Consult the cabling system plan to set up the cable labeling and record keeping system best suited to the environment. Also consider the following recommendations:

- Identify cables by securely attaching a label to the ends of all cables.

- Draw a floor location grid matrix using the building floor plans. For easy reference, use this grid when assigning location numbers to cables.

- Assign a unique block of sequential numbers to the group of cables that run between each pair of wiring closets.

- Assign a unique identification number to each distribution rack.

- Make all work areas and wiring closets easy to identify by labeling the front panel of the CoreBuilder 7000 and other hardware and by displaying the floor location grid and cabling plan in each wiring closet.

- Keep accurate and up-to-date cable identification records, such as IBM's Cable Identification Label Sheet or Cable Schedule. Post records near each distribution rack. On the appropriate cable schedule, record the following cable drop information: the cable source, destination, jumper location, and any additional information.

- Make sure that optical and coax cables are labeled Rx and Tx accordingly.

| **ATM Cabling** | When planning the installation, thoroughly inspect the present cabling to determine if it meets the specifications in the cabling system or standards used at the site. |

When planning the installation, thoroughly inspect the present cabling to determine if it meets the specifications in the cabling system or standards used at the site.

In addition to adhering to the local standards, all cable must conform to the American National Standard *ATM Physical Layer Medium Dependent* (PMD) standard, ISO.166-1990, American National Standards Institute, which defines the Physical Medium Dependent (PMD) layer of the ATM network. Currently, there are two approved PMD standards: Multi-mode Fiber (MMF-PMD), which is defined in ANSI standard X.3-166-1992, and Single Mode Fiber (SMF-PMD), which is defined in ANSI standard x.3-184-198x.

3Com supports multi-mode fiber (MMF-PMD) 62.5/125 µm and Category one (1) single mode fiber (short reach) (SMF-PMD). When deciding whether to use multi-mode or single mode fiber, determine the maximum interstation distance (the distance from the CoreBuilder 7000 to any potential end station):

- If the maximum interstation distance is less than or equal to 2 kilometers (1.25 miles), use multi-mode fiber (MMF-PMD).
- If the maximum interstation distance is greater than 2 kilometers (1.25 miles) and less than or equal to 14.4 kilometers (8.6 miles), use single mode fiber (short reach) (SMF-PMD).

Caring for Fiber Optic Transceivers

Fiber optic transceivers are sensitive optical devices that need careful handling. The following information offers suggestions about caring for fiber optic cable.

Dirt on the Fiber Optic Lens

If dirt collects on the fiber optic lens, you may notice that the LED for an ATM port either does not light or lights yellow. You may also notice degraded performance of that port, as indicated by a decrease in the Link Error Rate (LER) estimate for that port.

To prevent dust from collecting on the fiber optic lens, keep the dust covers on the ports at all times when they are not in use. To clean a fiber optic lens when it becomes dirty, see the section "Cleaning Dirty Fiber Optic Cables".

Damaged Transceiver Due to Excessive Insertion Force

The ATM specification for insertion force on the connector into an ATM SC receptacle is 3.5 lbs. However, it is possible to exert up to 30 lbs. of insertion force on the transceiver if you are too forceful while inserting the SC connector into the receptacle. This can cause failure of the transceiver's mechanical joints, permanently damaging the part and disabling the port.

When inserting connectors into the ATM ports, gently insert the SC connector into the receptacle until you hear the connector click into place. Use only enough force to engage the connector in the receptacle - no more than 3.5 lbs. This will avoid damage to the transceiver.

Multi-mode Fiber Standards

The MMF-PMD standards define the requirements for an ATM cable plant to support an interstation distance of up to 2 kilometers (1.25 miles) of multi-mode fiber. The cable plant includes all fiber optic components between any two communicating ATM devices and their associated "station-to-network" connectors at each end.

To determine whether the cable plant complies with the MMF-PMD standard, do the following:

1 Compare the specifications of the fiber you are using to standard specifications, as described in Table E-1 and Table E-2.

2 If unlike fibers are mated in the cable plant, calculate insertion losses to see whether they exceed the maximum attenuation value allowed for a link, as described in Table E-3 and Table E-4.

3 Verify that the fiber's modal bandwidth is within an acceptable range for the length of the link, as described on page E-7.

The following sections describe each of these steps and give examples.

Comparing Fiber to Specifications

Compare the specifications of the fiber you are using to those in the following tables. If the fiber does not meet the specifications, use a different fiber or contact 3Com's Technical Support.

The fiber you use must meet the specifications listed in Table E-1, which describes the standard set forth in MMF-PMD. Table E-2 describes 62.5/125 cable, commonly sold as "ATM Spec," which meets all the requirements of the MMF-PMD standard.

Table E-1   Standard Multi-mode Fiber Specification

Specification	Description
Core	62.5 μm diameter
Cladding	125 μm diameter nominal
	122 μm minimum
	128 μm maximum
Numerical aperture	0.275
Maximum attenuation	11 dB* (1dB allowed for reflection and dispersion penalties.)
Modal bandwidth	500 MHz. km
Maximum distance between nodes	2 km
Output power (from transmitter)	19 dB minimum
	14 dB maximum
Receive power	30 dB minimum sensitivity
	14 dB maximum sensitivity

*Maximum attenuation includes cable attenuation and the loss induced by other components such as connectors, splices, and the mating of unlike fiber types. Although some 2 km cable plants have a total attenuation of less than 11.0 dB, the 2 km interstation distance must be maintained to comply with modal bandwidth requirements.

Table E-2   Alternate Multi-mode Fiber Types

Core (μm)	Cladding (μm)	Numerical Aperture
50	125	0.20
50	125	0.22
85	125	0.28
100	140	0.29

Calculating Insertion Losses for Unlike Fibers

If unlike fibers are mated in the cable plant, calculate insertion losses to be certain that the cable plant does not exceed the maximum attenuation value listed in Table E-1. To calculate the insertion loss, consider the types of fiber in the cable plant and the connectors or splices used to join them. Compare the result to the maximum attenuation value listed in Table E-1. If the result is greater than the value in the table, use only like fibers in the cable plant.

Refer to Table E-3 for the insertion losses of the fibers themselves. Use Table E-4, which lists the losses for connectors, cables, and splices, if the specifications for these components are not available.

Use Table E-3 for fiber-to-fiber connections only, not for power launched from a transmitter.

Table E-3 Insertion Losses for Mating Unlike Fiber Types - Transmitting Fiber

Receiving Fiber Size	Numerical Aperture	50 μm	50 μm	62.5 μm	85 μm	100 μm
		0.20	0.22	0.275	0.26	0.29
50 μm	0.20	0.0	0.4	2.2	3.8	5.7
50 μm	0.22	0.0	0.0	1.6	3.2	4.9
62.5 μm	0.275	0.0	0.0	0.0	1.0	2.3
85 μm	0.26	0.0	0.0	0.1	0.0	0.8
100 μm	0.29	0.0	0.0	0.0	0.0	0.0

Table E-4 Typical Losses for Typical Connectors, Cables, and Splices

Type of Insertion	Loss
SC connector	.6 dB
ST connector (ceramic)	.6 dB
ST connector (plastic)	1.0 dB
ST connector (stainless steel)	.7 dB
62.5/125 cable	1.0 to 3.0 dB maximum per km, depending on cable quality (nominal 2.0 dB)
8/125 cable	.5 dB/km (AT&T Lightguide)
Bypass switch (currently not available in single mode)	2.5 dB maximum
Fusion splice	1 to 3 dB depending on type used (use .3 dB)

Example.

Suppose that a link consisting of one km of 62.5/125 fiber with a maximum attenuation rating of 1.75 dB/km is transmitting into one km of 50/125 fiber with a maximum attenuation rating of 3 dB/km. The fibers are joined using a fusion splice rated at 0.3 dB and the link contains one in-line ST connector rated at 0.6 dB.

The following calculation would arrive at the link loss attenuation value for this linked fiber (Table E-5):

Table E-5   Link Loss Attenuation Calculation

62.5μm cable loss	+ 50μm cable loss	+ splice loss	+ ST con-nector loss	+ insertion loss*	= Total link attenuation
1 km(1.75 dB/km)	+1 km(3 dB/km)	+0.3 dB	+0.6 dB	+2.2 dB	=7.85 dB

* for mating unlike fiber types

Because the resulting value, 7.85, does not exceed the maximum attenuation value listed in Table E-1, no adjustments are needed in the types of fibers joined or how they are connected. The link meets all of the specifications of the MMF-PMD.

Verifying Modal Bandwidth   The bandwidth of an optical fiber is the lowest frequency where the magnitude of the baseband frequency response has decreased by 3 dB compared to the magnitude at zero frequency. Bandwidth for multi-mode fiber is referred to as modal bandwidth because it varies based on the modal field (or core diameter) of the fiber. Modal bandwidth is specified in units of MHz • km, which indicates the amount of bandwidth supported by the fiber for a one km distance.

The modal bandwidth specified in Table E-1 is 500 MHz • km, which allows the cable plant to support end-to-end bandwidth of 250 MHz at the maximum 2 km distance. As a check, use the following formula to verify that the bandwidth of the fiber is within an acceptable range:

n MHz • km / xkm = y MHz

In this formula, *n* is the amount of bandwidth available according to the fiber specification. Divide this number by the total length *x* of the fiber in kilometers. The result is the modal bandwidth *y*, measured in MHz.

If the result is lower than 250 MHz, the link may increase bit errors. To reduce the likelihood of bit errors, shorten the length of the fiber or use different fiber until the result of the calculation reaches 250 MHz.

Example. Cable with a modal bandwidth of 500 MHz • km will have 250 MHz of bandwidth at 2 km:

(500 MHz • km) / 2 km = 250 MHz

The same cable would have 500 MHz of bandwidth at 1 km. A fiber cable with a bandwidth specification of 200 MHz • km would have only 100 MHz of bandwidth at 2 km, which would not support ATM. In this case, another type of fiber would be required.

Single Mode Fiber Standards

The SMF-PMD standard defines the requirements for an ATM cable plant to support a connection distance of up to 14.4 kilometers (8.6 miles) of single mode fiber. The cable plant includes all fiber optic components between any two communicating ATM devices and their connectors at each end.

To determine whether the cable plant complies with the SMF-PMD standard, do the following:

1 Compare the specifications of the fiber you are using to standard specifications, as described in Table E-6.

2 If you mix equipment supporting Category 1 and Category 2, verify the maximum attenuation between the equipment, as described in Table E-7.

The following pages describe each of these steps and give examples.

Comparing Fiber to Specifications

Compare the specifications of the fiber you are using to those in Table E-6. If the fiber does not meet the specifications, use a different fiber or contact 3Com Technical Support.

The single mode PMD specification (SMF-PMD) defines two optical power categories: Category 1 and Category 2. These categories refer to the optical power that must be launched into the fiber by the transmitter or detected by the receiver. 3Com currently supports only Category 1 single mode fiber.

The specifications for the standard single mode fiber are listed in Table E-6. Refer to the Category 1 specifications in this table for fiber connecting 3Com equipment. For fiber used with Category 2 equipment from another vendor, refer to the Category 2 specifications.

The cable plant for a Category 2 implementation must have a minimum loss of 15.0 dB. In a Category 2 implementation, minimum cable plant losses are required to avoid saturating (blinding) the receiver.

Table E-6   Single Mode Fiber Specifications

Category	Specifications	Descriptions
Both Categories	Core	8 to 10 μm
	Cladding	125 μm (±2 μm)
Category 1	Output power	14 dB minimum
	(from transmitter)	8 dB maximum
	Receive power	32 dB minimum
		8 dB maximum
	Maximum distance* between ATM devices	14.4 km
	Maximum attenuation**	10 dB (1 dB allowed for reflections and dispersion penalties)
Category 2***	Output power	4 dB minimum
	(from transmitter)	0 dB maximum
	Receive power	37 dB minimum
		15 dB maximum
	Maximum distance* between nodes	58.6 km
	Maximum attenuation**	32 dB (1 dB allowed for reflections and dispersion penalties)

* Maximum distances assume cable with one splice every 2.2 km with 0.3 dB loss each, and with no patch panels or mechanical splices.

** Maximum attenuation includes cable attenuation and the loss induced by other components such as connectors, splices, and the mating of unlike fiber types.

***Category 2 based on FDDI information, no ATM specific information yet.

Verifying Maximum Attenuation for Mixed Fibers

If you mix Category 1 and Category 2 receivers and transmitters, use Table E-7 to verify the maximum attenuation for each possible combination.

Table E-7 Acceptable Cable Plants for Combination of Categories 1 and 2

Output Category	Input Category	Minimum Loss (dB??)	Maximum Attenuation (dB??)
1	1	0.0	10.0
1*	2*	1.0	16.0
2	1	14.0	26.0
2	2	15.0	32.0

*This combination is dispersion-limited rather than loss-limited. The expected maximum length is approximately 35 km.

Example. If a Category 2 transmitter is outputting to a Category 1 receiver, the maximum attenuation is 26.0.

DS-3 Coax Cables

Connect the CoreBuilder 7000 DS-3 interface by a 75 Ohm coaxial cable that complies with DS-3 standards. The maximum cable length is 450 feet. To connect the DS-3 interface:

1 Prepare two coax cables - one for Tx and one for Rx. You may want to mark the ends of the cables to identify them easily.

2 Connect both cables to the DS-3 BNC connectors on the CoreBuilder interface. Make sure to connect Rx and Tx cables according to what is indicated on the interface front panel.

3 Connect the two cables at the other end according to the opposite of the first connection Rx to Tx and Tx to Rx.

Ethernet Cabling   The Ethernet port of the CoreBuilder allows you to connect the CoreBuilder to an Ethernet network for Network Management Station (NMS) connectivity (such as Transcend™). The Ethernet port is a standard RJ-45 connection of a terminal side.

Follow these guidelines for 10BASE-T cabling:

- Use only copper, unshielded twisted-pair (UTP) wiring. Do not use flat, multiconductor cable (for example, silver satin), which is often identified by solid colors such as red, green, yellow, or black.
- Use two twisted-pairs for each link.
- Use twisted-pair wire that is 22-26 AWG (0.5 millimeter) in diameter.
- Use twisted-pair wire with an impedance between 85 and 115 ohms.
- Make sure that the maximum twisted-pair link length from the system to any potential workstation location is 100 meters (328 feet).

Cable Pinouts   Management connections may be established with a direct cable link to a PC-AT serial port, or via modem. The following tables detail cable pinouts for 9 and 25 pin PC-AT links, and for a modem connection.

CoreBuilder 7000 Serial Port

The CoreBuilder 7000 provides a standard DB-9 connector for management connections (refer to Figure E-1). Table E-8 details the pinout and functions for this connector. The CoreBuilder 7000 plays the standard role of a DCE.
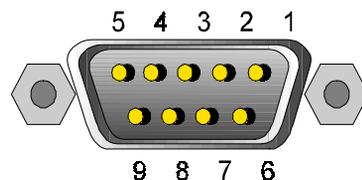
Figure E-1 Serial Port Pinouts

Table E-8 Serial Port Pinout and Their Functions

Pin	Signal	Meaning
1	RTS	Request to Send
2	TxD	Transmit Data
3	RxD	Receive Data
4	DSR	Data Set Ready
5	GND	Ground
6	DTR	Data Terminal Ready
7	CTS	Clear to Send
8	RTS	Request to Send
9	NC	Not Connected
Shell		Protective Ground

Table E-9 correlates the cable pinouts between the CoreBuilder 7000 and a 9-pin and 25-pin PC-AT serial interface. Unspecified pins are unused.

Table E-9 Cable Pinouts To a 9-Pin and 25-Pin Serial Interfaces

CoreBuilder 7000 Serial Port 9-pin Male		To PC-AT Serial Port 9-pin Female		To PC-AT Serial Port 25-pin Female	
Screen	Shell	Shell	Only req. if screen	Shell	Only req. if screen
TxD	2	2	RxD	3	RxD
RxD	3	3	TxD	2	TxD
GND	5	5	GND	7	GND
RTS	1				
CTS	7	7	RTS	4	RTS
RTS	8	8	STS	5	CTS
DSR	4	4	DTR	20	DTR
DTR	6	6	DSR	6	DSR

Table E-10 correlates cable pinouts between the CoreBuilder 7000 and a modem interface.

Table E-10   Cable Pinouts To a Modem Interface

CoreBuilder 7000 Serial Port 9-pin Male		To Modem Port 25-pin Male	
Screen	Shell	Shell	Screen
TxD	2	2	RxD
RxD	3	3	TxD
RTS	8	4	CTS
CTS	7	5	RTS
DSR	4	6	DTR
GND	5	7	GND
RTS	1	8	DCD
DTR	6	20	DSR

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3Com Corporation LIMITED WARRANTY

The duration of the warranty for the CoreBuilder 7000/7000HD Chassis and Switch Engine is: Enhanced One-year Limited —— return to factory for free repair. One year warranty with 90 days of Advance Hardware Replacement service, subject to availability.

The duration of the warranty for all other CoreBuilder 7000 Hardware Modules is: One Year limited — return to factory for free repair. Advance Hardware Replacement service is available for an additional fee, subject to availability.

HARDWARE	3Com warrants its hardware products to be free from defects in workmanship and materials, under normal use and service, for the following lengths of time from the date of purchase from 3Com or its authorized reseller:

Network Interface Cards	Lifetime
Other hardware products *unless otherwise specified above	1 year*
Spare parts and spares kits	90 days

	If a product does not operate as warranted above during the applicable warranty period, 3Com shall, at its option and expense, repair the defective product or part, deliver to Customer an equivalent product or part to replace the defective item, or refund to Customer the purchase price paid for the defective product. All products that are replaced will become the property of 3Com. Replacement products may be new or reconditioned. Any replaced or repaired product or part has a ninety (90) day warranty or the remainder of the initial warranty period, whichever is longer.
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	Any software update or replaced or repaired product will carry a Year 2000 Warranty for ninety (90) days or until April 1, 2000, whichever is later.
OBTAINING WARRANTY SERVICE	Customer must contact 3Com's Corporate Service Center or an Authorized 3Com Service Center within the applicable warranty period to obtain warranty service authorization. Dated proof of purchase may be required. Products returned to 3Com's Corporate Service Center must be pre-authorized by 3Com with a Return Material Authorization (RMA) number marked on the outside of the package, and sent prepaid and packaged appropriately for safe shipment, and it is recommended that they be insured. The repaired or replaced item will be shipped to Customer, at 3Com's expense, not later than thirty (30) days after receipt of the defective product by 3Com.
	Dead- or Defective-on-Arrival. In the event a product completely fails to function or exhibits a defect in materials or workmanship within the first forty-eight (48) hours of installation but no later than thirty (30) days after the date of purchase, and this is verified by 3Com, it will be considered dead- or defective-on-arrival

(DOA) and a replacement shall be provided by advance replacement. The replacement product will normally be shipped not later than three (3) business days after 3Com's verification of the DOA product, but may be delayed due to export or import procedures. When an advance replacement is provided and Customer fails to return the defective product to 3Com within fifteen (15) days after shipment of the replacement, 3Com will charge Customer for the replacement product, at list price.

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